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THE AEROPLANE

Edited by C. G. Grey

WEDNESDAY, OCT. 3, 1917

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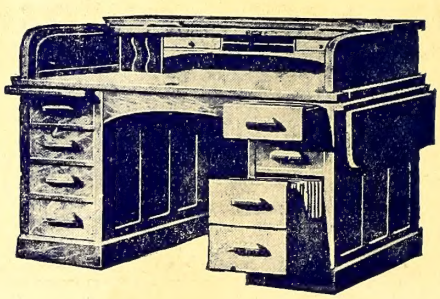
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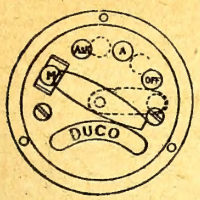
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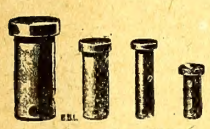
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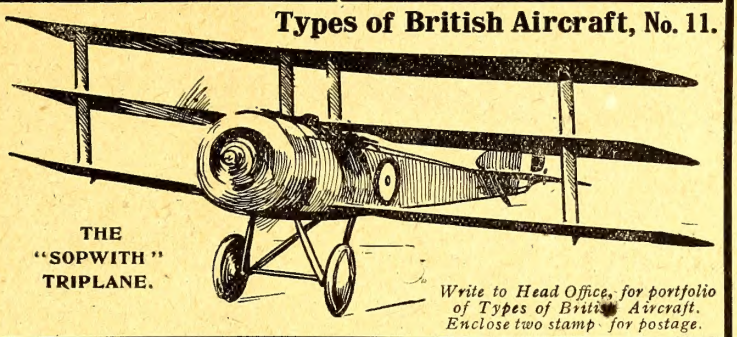


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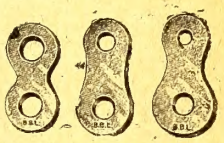
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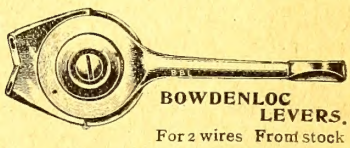
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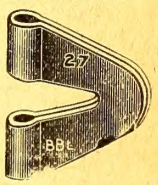


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be just as happy in an Imperial Air Service, with sky-blue jackets and puce pants, as in any other. And so long as they had their fill of fighting and bomb dropping, and got the best possible machines and weapons, they would not care whether they were commanded by General Booth or the King of Siam.

Therefore there is quite good reason for forming an Imperial Air Service, drawn from the Five Nations and the Seven Seas, simply and solely as a raiding and fighting service. Only, if it is going to be a true Imperial Air Service, the various self-governing sections of the British Empire which contribute men to this service should also contribute money and machines to its upkeep, in proportion to the number of men which they supply, whether as pilots, passengers, or mechanics. If it is Imperial, then the Empire should pay for it, and the whole financial burden should not fall on the unfortunate taxpayer who happens to exist in the British Isles.

Australia, I believe, already pays the personnel of her own squadrons of the R.F.C., but I do not know whether she pays for their machines and weapons and ammunition. If not, she ought to do so. Canada, though she has sent us many of our finest pilots both R.N.A.S. and R.F.C., has not yet raised a Canadian squadron, but doubtless in an Imperial Air Service she would be wishful to have distinct squadrons of her own. Such an arrangement would lead to a healthy spirit of emulation, and thus to increased effectiveness.

Yet Another Alternative.

There is yet another alternative, in which all the flying people might be called "The Imperial Air Service," though divided into three distinct sections, one for the Navy, one for the Army, and a third for air raiding and fighting. Personally this does not seem to me as satisfactory as three separate services, entirely independent of one another in command.

In the first place, if all three branches had to wear the same uniform, which would be neither naval nor military—say, for instance, as has been suggested in some quarters, the present R.F.C. uniform done in Navy cloth—the I.A.S. personnel would be with the Army but not of the Army, in the Fleet but not of the Navy. This would only be a resuscitation of the old idea of 1912, of a Royal Flying Corps, with Naval and Military wings, the "Aeroultramarine" at which one jested five years and so ago. Still, it would be better than lumping the lot and leasing men and machines as they might be required by either of the Senior Services.

The Real Way Out.

As a matter of fact, very little improvement on the present system is required. The R.N.A.S. should give up all its seagoing machines and their personnel to the Navy, which should absorb such personnel into the Navy proper and the R.N.A.S. should cease to exist.

The R.F.C. should remain as it is—an integral part of the Army, with the Army's discipline and traditions. Pilots and observers might be altogether R.F.C., or they might be seconded from other regiments as at present, according to the custom between other branches of the Army.

The shore-going machines of the R.N.A.S. and their personnel should be taken away from the Navy and made the nucleus of the Imperial Air Service. In time the I.A.S. will grow to be as big as the Army, and many times bigger than the Navy, for on it will depend the freedom of this country from real invasion in the next war—say 20 or 30 years hence, or perhaps less. Therefore it offers a life's work to those who choose to transfer to the I.A.S. from the R.N.A.S. or the R.F.C.

Meantime the arguments between the Unitarians as representing belief in a single service, one and indivisable, and the Trinitarians, representing the idea of three distinct services, with the present Air Board to regulate supplies and prevent "cornering" by any one service, reach the vehemence of a religious argument. The violence of the debaters recalls Gibbon's humorous descriptions of the debates between Nicenes, Aryans, Nestorians, Jacobeans, Gabellians, and other assorted dogmatists of the early days of Christianity.

The Matter of Ranks.

The organisation of the I.A.S. should be on distinctly military lines, rather than on Naval lines, and there seems no reason why military ranks should not be retained, if only to avoid confusion when the two services meet, for the I.A.S. and the Army would naturally be more closely in touch than would the Navy and the I.A.S., seeing that the work of the I.A.S. would be almost entirely over land.

There seems no real need to invent comic new titles for the different ranks. Everyone knows where he is with a General, a Colonel, a Major, a Captain, or a plain Mister in the case of a subaltern, and it is the little matters of conversational titles which really matter most.

The R.F.C. has been wise in sticking to its military ranks for conversational use, and using its R.F.C. titles only as gradings.

The Admiralty has been characteristically unpractical in making the special titles of the R.N.A.S. into actual ranks, and it has complicated the difficulty with its weird stars and stripes and dickie-birds and things. As a result, on occasion one finds Flight-Commanders with two stripes and a star, Squadron-Commanders with two stripes and two stars, or perhaps two and a half stripes and two stars, and Wing-Commanders with three stripes, no stars, and a brass hat, all addressed impartially as "Commander." Or, in air stations themselves, one finds junior officers and ratings talking to and of Squadron-Commanders as "Mister So-and-So," which conveys to a stranger to the station no idea of the officer's rank.

In the Army, where everything is clear, concise, and practical, there can be no ambiguity. A Squadron-Commander R.F.C. is a Major, he wears a crown on his cuffs or shoulder straps, and his wings on his chest, and whether you see him or hear someone speak of him you know what he is.

The R.N.A.S. goes and complicates matters still further by putting its dickie-bird and stars on one cuff only, so that when you meet a personage in blue with two stripes, you have to walk round him to the right side— which I believe is his left—to see whether he is a *pukka* Lieutenant R.N., a Flight-Lieutenant R.N., a Flight-Commander R.N., a Squadron-Commander R.N., a mercantile Marine officer, or a kinema attendant.

To Avoid Complications.

It is to be hoped that if and when the Imperial Air Service arrives it will avoid these silly complications. Even if it goes right away from the Army uniform and adopts the German "field-grey," which would be the most sensible thing of the lot, it should stick to military rank badges, if only because everyone knows their relative value. Few know the value of Naval stripes, and fewer still know the R.N.A.S. stars. Which is so for the good and sufficient reason that all the friends and relations of some 7,000,000 men are interested in the Army, only those of half a million or so are interested in the Navy, and only those of a few thousands are at all concerned about the R.N.A.S.—despite the Admiralty's gallant efforts to advertise it in special communiqués.

It is particularly to be hoped that no new ranks will be invented specially for the I.A.S. It is bad enough to have to remember that a Captain R.N. is three steps in rank higher up than a Captain R.E., without introducing further complications. Army ranks and R.F.C.

gradings ought to be good enough for any new Service, whether it includes the other two or is additional.

For Heaven's sake do not let us have portmanteau or freak words invented for new ranks, such as "Air-miral," or "Squadleader," or "Flighter," or any other wild things that look like telegraphic addresses of aeronautical accessory makers. People who are not content with the time-honoured ranks of the Army are quite capable of such atrocities.

Command Rumours.

Finally, there is the question of the High Command of such a force as an Imperial Air Service. So far as I can see, if any I.A.S. is to include the existing flying Services, I cannot see any reason to go outside them for the highest officers. There is precious little the matter with the people who are doing the actual work of running the Services to-day. But if the I.A.S. is to be a wholly separate show, for raiding and fighting only, it is perhaps another matter.

The name of General Smuts has been frequently mentioned for such a post. Anyhow, he is a man of foresight, a fighting man, and a man with a trained legal brain capable of tackling and defeating the intrigues which would be bound to arise in a service composed very largely of young and ambitious men.

Another name mentioned is that of Rear-Admiral Mark Kerr. Why Admiral Kerr was not put in command of the R.N.A.S. years ago is a matter which would bear discussion. He is senior to any naval officer who has ever displayed any interest in aeronautics. He is himself a pilot of real ability. He is a born leader of men. He has the gift of making plenty of enemies, which is always a sign of strength of character. He is what few naval officers are, a man of the world and a diplomatist. What he does not know about the Courts of Europe is worth little, but he is equally a sailor of daring and success. And, above all, he believes firmly in the importance of the mastery in the air as the only salvation and protection of this country. There might be many worse choices for the command of an independent Imperial Air Service than Admiral Kerr.

General Capper's name has also been mentioned. As a Colonel R.E., General Capper ran the Balloon Factory at Aldershot, where he, alone among those having authority, encouraged the late Mr. S. F. Cody in his work with war-kites, airships, and aeroplanes. He took part personally in experiments with the Dunne gliders at Blair Athol, and later with the Dunne aeroplanes at Eastchurch and Lark Hill—in fact, I believe that, after he left the aeronautical branch of the Army, he actually bought and paid for a Dunne machine, with which to experiment by himself. At any rate, I remember him taxying furiously on a Dunne monoplane at, I think, the time of the Military Trials of 1912. Since then, however, General Capper has not been in close practical touch with aviation. He has done excellent work in this war, and, one gathers, is doing work for which his training eminently fits him. He is an officer in whose sound judgment everyone trusts, but he is a Sapper, and hardly such a "thruster" as is needed to make an Imperial Air Service so thoroughly offensive (to the enemy *bien entendu*) as it should be.

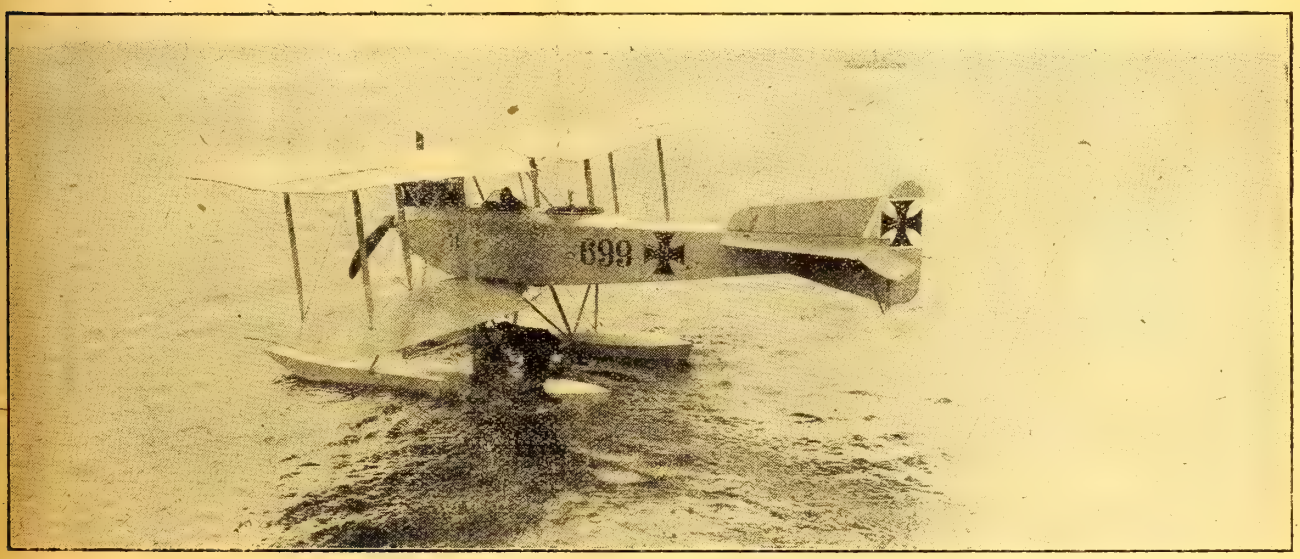
Probably there are many other officers of high rank who would like the job, but one does not recall any with experience of aeronautical affairs who are sufficiently senior for the command. Anyhow, we shall probably hear to-day, or to-morrow, or next week, or next month, or perhaps next year, what the Government has decided to do about a serious aerial offensive.

The Work of an Imperial Air Service.

Our defensive service is in such good hands that there is no need to discuss it. It is our offensive service which needs intensive cultivation. So far the so-called offensive raids on German aerodromes in Belgium have been purely defensive. They have merely been calculated to deplete the forces of German aircraft assembled for the invasion of England, or to annoy German naval forces in Belgian ports, and so save the Dover Patrol a certain amount of trouble.

If the R.N.A.S. in Flanders had concentrated all their efforts on Germany's aircraft in Belgium a year ago, with adequate forces under a keen and energetic leader, there would be no raids on London at all to-day, for by this time we should have had an overwhelming mastery of the air in that area. But though that area is really where our London defences should begin, it is not part of the London defences, so no blame attaches to our defence forces for such enemy aeroplanes as reach this country.

Our real aerial offensive only begins to the east of the German Frontier. Apart from fighting over Belgium and France on the way to Germany, the work of the Imperial Air Service will really begin when it drops its first bomb on a German city. Until then, if it comes into existence in response to popular clamour, it will merely be obtruding itself into the legitimate work of the two Senior Services.—C. G. G.



A German Seaplane of neat type, with evident Howard Wright influence in float design. The observer is on the heel of the port float, giving a hand to a comrade swimming over from a capsized seaplane in the vicinity.

THE AERONAUTICAL HISTORY EXHIBITION.

Mr. Asquith opened at Leeds Town Hall, on Sept. 27th, the Air Services Exhibition organised by the Countess of Drogheda, in aid of the Flying Services Hospitals and Viscount French's War Charities. He said he accepted with the greatest pleasure the invitation which Lady Drogheda was good enough to give him to take advantage of his visit to Leeds to attend the opening of her exhibition. He had had the privilege of going over it some months ago in London, and he believed it had since been considerably augmented and enlarged. As they went around it they would be able to trace, little by little, and one after another, the steps—often the slow and stumbling steps—by which man had achieved, or, at any rate, was achieving, the conquest of the air.

When they had traced the process they would be as strongly impressed as he was with the foresight, pains, and skilful arrangement and organisation which Lady Drogheda had brought to her task, and which enabled him, without any suspicion of flattery or exaggeration, to say that it was one of the most remarkable contributions that women's work had made to the service of the war. (Hear, hear.)

"I am old enough to remember," Mr. Asquith continued, "the days when ballooning, as it was then called, was considered to be a rather eccentric and decidedly dangerous pastime. But the type of aircraft which still goes by that generic name has now become, as we all know, an indispensable part of the apparatus of war. I say nothing of the Zeppelin, save that, except perhaps for scouting purposes, it has turned out to be, in my judgment, a costly failure. [Which shows how much Mr. Asquith knows about munitions. And yet he at one time was permitted to misdirect the war policy of this unfortunate country.—Ed.]

"But the captive balloon—the sausage as the soldiers call it—is an invaluable adjunct in these days to any considerable fighting force. Only a week ago I was somewhere between Ypres and the Messines ridge, near where the splendid fighting of which we are reading again to-day was going on, and I saw in the sky a row of some twelve or fifteen of those captive balloons, all making their observations at different altitudes, heavily shelled at times, but I am glad to say unsuccessfully, by the Germans, and each protected in case of disaster by its parachute. That is a wonderful sight. [Of course, Mr. Asquith would be the last person to know of all the obstructions which were put in the way of introducing the kite balloon into the British Army and Navy. Did he ever see the correspondence between a distinguished artillery officer and the War Office on the subject? Incidentally, how does one protect a kite-balloon with a parachute?—Ed.] Even more remarkable and more rapid has been the development of the other type of craft, heavier than air, that we know as aeroplanes. The Duke of Wellington was once asked, I think in his old age, what had been his greatest difficulty as a general, and he said, 'I spent the most of my life in trying to find out what was going on upon the other side of the hill.' [That presumably is why, before the War, Mr. Asquith, as Premier and First Lord of the Treasury, refused money for the development of aircraft.—Ed.] His successors who command the armies of to-day have no such anxiety or solicitude, and why? Because of the aeroplane, with its photographic apparatus, its wireless, its capacity to soar to enormous heights, and disclose and reproduce for the information of the general and his staff every feature of the contour and disposition of the enemy. [A delightful phrase. Imagine an observer officer sending in a sketch and report of the contour and disposition of a fat and sulky Hun! And, anyhow, does one make a contour map from above?—Ed.] Equal in importance—some military experts would say more important in these days of artillery warfare—is the service which the aeroplane renders to the guns, which are able to aim with miraculous precision at absolutely invisible targets and over almost inconceivable ranges. In fact, it is no exaggeration to say—and I am sure all the military experts who are present will agree with me—that the air service has become the eyes of the Army, and to a large extent also of the Navy.

"There are other forms of aerial activities upon which I need not dwell, and with which those of us who live in London are becoming daily or nightly more familiar. I will only say they do not alarm us in the least, and that we have complete confidence in the powers of our own airmen and land defences to keep them at bay. [Which sounds very pretty in Leeds. One suggests that Mr. Asquith should take a trip on the tubes after a "take cover" warning has been issued.—Ed.] Let me say before I sit down, for it is, after all, the abiding reflection that ought to be left in our minds after visiting such an exhibition as this, that we cannot see and realise the meaning of all that is gathered together here without feeling a profound and fervent admiration for the gallant men who are risking their lives every day and every night in this most hazardous service for the cause of their country, and to whom, and to whose skill and to whose devotion the Navy and the Army, and not only them, but the country and the Empire, owe an immeasurable debt of gratitude." [If Mr. Asquith had let them have cash four years ago, instead of owing them a debt now, the aforesaid "gallant men" would be in a far better position.—Ed.]

Mr. Rupert Beckett proposed a vote of thanks to Mr. Asquith, which was seconded by Mr. J. S. R. Phillips.

Mr. Asquith, in reply, said: "You owe me no thanks at all. [Hear! Hear!!—Ed.] What I have come here to do has been a pure pleasure. Mr. Phillips has spoken of soaring as a politician, but if you look round this exhibition you will find that some of the objects suggest to you the counterpart of soaring, which is sinking, and politicians spend their unhappy lives oscillating between those two positions. (Laughter.) Lady Drogheda suggests to me that they are lucky if they can get a parachute to make safe their occasional descent. (Laughter.) [The pity is that they do.—Ed.] I hope that you, my Lord Mayor, and your fellow-townsmen will make the most of your opportunities here, and that particularly the young people in the schools will be able to see this exhibition, and will realise all it means for us, for the Empire, and for the future. (Cheers.)

The Lord Mayor of Leeds presided at the ceremony, and among those present were Mrs. Asquith, the Countess of Drogheda, and Sir Algernon and Lady Firth.

CAPTAIN LAUREATI IN LONDON.

Prince Borghese, Italian Chargé d'Affaires, speaking on Sept. 26th at a banquet in honour of the famous Italian aviator, Capt. Giulio Laureati, the hero of the non-stop flight from Turin to Hounslow, said: "That so short a time should have been taken in the journey was a symbol of the unceasing, auspicious progress which the peoples of the two countries were accomplishing in their cordial Alliance. Those few hours of flight seemed, indeed, as it were, to shorten, if not quite to abolish, the distance dividing us." "On the auspicious occasion which unites us," he added, "I am glad to have the honour to represent the Government of His Majesty the King of Italy, in order that I may send a greeting and good wishes to the hardy explorers of the air, to the champions of aviation of the Allied nations."

* * *

On Sept. 27th Capt. Laureati was entertained to a charming and entirely informal lunch by Capt. Darcy-Baker, the head of the London Fiat firm. Oddenino the Inimitable surpassed himself in producing a war-meal for his distinguished compatriot. Even the famous dinner given recently by the putative Thousand Million Pound Syndicate to the Press of England did not beat it for good taste—in both senses of the word.

Lord Montagu of Beaulieu in proposing the health of the distinguished guest referred felicitously to the lesson which his flight taught the people of this country as to the possibilities of modern aeroplanes, both for the purposes of bombing German towns, and for postal and passenger services after the war. Afterwards he presented to Capt. Laureati, on behalf of Capt. Darcy-Baker and his friends a handsome silver box engraved with a map of the flight.

Capt. Laureati, speaking in excellent French, gracefully acknowledged the compliments paid him, and referred to the good comradeship which existed between the soldiers and aviators of the Kings of Italy and England. Baron Mayor Deplanche, of the Italian Commission in England, also spoke for the amicable relations between the two countries.

The Flying Services were well represented by three Brigadier-Generals R.F.C. and two Wing-Commanders R.N.A.S., besides sundry junior officers. Several civilians were also honoured by inclusion among the guests, who were composed entirely of personal friends of the so-excellent host.

* * *

On Sept. 28th Capt. Laureati was again entertained at lunch, this time by the Royal Aero Club. The affair was quite informal, and only some thirty people were present. Col. Holden, the Deputy-Chairman of the Club, presided, and proposed the health of the guest of the day, whose seven-hour flight, he said, marked an epoch in aerial transport, by showing that Turin and London are closer together by air than Paris and London are by rail and steamboat.

His Excellency Baron Mayor Deplanche, who has represented Italy at Washington, and at Constantinople in pre-war days, in a singularly diplomatic speech, remarked that he saw before him on the table the flag of England and the flag of Italy, and between them a cradle of flowers. He wished that for all time nothing less charming should come between the two flags. Occasionally flowers had thorns, but such thorns must never be allowed to grow between Italy and England.

Incidentally Mr. Frisby, the steward of the Aero Club, deserves due credit for the tasteful decoration which inspired so happy a sentiment in so distinguished a diplomat. And furthermore, he deserves credit for putting on a lunch which would have done credit to the best of fashionable hotels. One fears that if Capt. Laureati is entertained to many more such meals he will return to Italy with the impression that the German submarine campaign is of no consequence whatever, and that we can well afford to feed as well as arm all our Allies—except in the matter of aircraft supplies, in which, of course, his sentiments are precisely the reverse.

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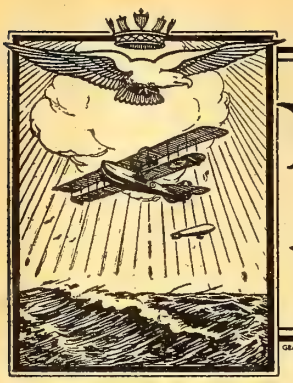
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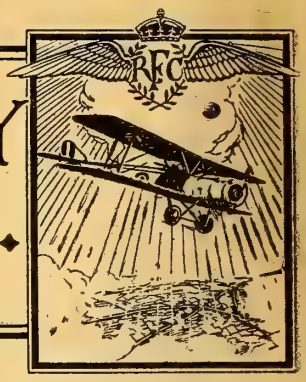
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Admiralty, Sept. 18th.

R.N.A.S.—Temp. Flt. Sub-Lt. to be temp. Flt. Lt.:—E. McD. Wright, Sept. 21st.

War Office, Sept. 25th.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing.—Flt. Comdr.—Temp. Lt. H. D. Harman, Gen. List, from a Flying Officer, and to be temp. Capt. whilst so empld., Sept. 12th.

War Office, Sept. 26th.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing.—Wing Comdr.—Capt. (temp. Maj.) C. R. S. Bradley, Ind. Cav., from a Sdqn. Comdr., and to be temp. Lt.-Col. whilst so empld., June 22nd.

Flt. Comdrs.—Lt. W. R. Read, M.C., D. Gds., and to be temp. Capt. whilst so empld., Sept. 5th.

From Flying Officers:—Sec. Lt. C. A. Stevens, W. Rid. R., and to be temp. Capt. whilst so empld., Sept. 11th. Lt. (temp. Capt.) I. A. J. Duff, Dorset R., T.F., Sept. 12th. The appt. of Sec. Lt. (temp. Lt.) F. T. Wood, North'n R., T.F., notified in "Gazette" of Sept. 11th, is cancelled.

Adjts.—Capt. L. W. David, Yeo., T.F., from Welsh R., T.F., and to be secd., June 30th. Lt. C. A. M. Holloway, R.W. Kent R., to be temp. Capt. (without the pay and allowances of that rank) whilst so empld., and to be secd., July 6th. Capt. J. E. Vernon, R. Dublin Fus., and to be secd.; Capt. F. E. B. Whitfield, Welsh R., Spec. Res., and to be secd., Aug. 28th. Temp. Sec. Lt. A. E. Morgan, S. Wales Bord., and to be temp. Capt. (with pay and allowances as Lt.) whilst so empld., vice Lt. F. S. Isaac, Worc. R., Spec. Res., Aug. 31st.

Park Comdrs.—From Equipment Officers, 1st Cl., and to be temp. Majs. whilst so empld.:—Lt. (temp. Capt.) J. T. Spittle, Spec. Res., July 23rd. Temp. Capt. E. J. Howard, Gen. List; Lt. (temp. Capt.) A. F. Palmer, Spec. Res.; Lt. (temp. Capt.) F. C. Rowe, Spec. Res.; Sec. Lt. (temp. Capt.) W. J. Shields, Essex R., Spec. Res., Aug. 30th.

Equipment Officers, 1st Cl.—From the 2nd Cl., and to be temp. Capts. whilst so empld.:—Temp. Lt. E. H. Hooper, Gen. List; Sec. Lt. (temp. Lt.) A. E. Blackmore, Spec. Res., Aug. 30th. Temp. Lt. T. de la Poer Beresford, Gen. List, Sept. 1st.

Experimental Officers, 1st Cl.—(Graded as an Equipment Officer, 1st Cl.)—Sec. Lt. (temp. Lt.) W. C. Mitchell, R.F.A., Spec. Res., from the 2nd Cl. (graded as an Equipment Officer, 2nd Cl.), and to be temp. Capt. whilst so empld., July 6th.

Gen. List.—The undermentioned Serjts from R.F.C. to be temp. 2nd Lts., Sept. 14th, 1917: Christopher Tom Walkington, John Ditchfield.

* * *

The King has been pleased to confer the following rewards for gallantry and distinguished service in the field. The acts of gallantry for which the decorations have been awarded will be announced in the "London Gazette" as early as practicable:—

Distinguished Service Order.

Sec. Lt. (temp. Capt.) A. Coningham, M.C., R.F.C., Spec. Res.
Temp. Sec. Lt. W. F. Leech, Gen. List and R.F.C.
Lt. (temp. Capt.) R. J. Lowcock, M.C., Notts and Derby R. and R.F.C.
Sec. Lt. (temp. Capt.) B. E. Sutton, M.C., Yeo., and R.F.C.
Temp. Maj. E. J. Tyson, M.C., Gen. List and R.F.C.
Sec. Lt. C. W. Warman, M.C., Gen. List and R.F.C.

Bar to the Military Cross.

Lt. (temp. Capt.) S. H. Clarke, M.C., Wilts R., Spec. Res. and R.F.C. (M.C. gazetted Nov. 14th, 1916).
Temp. Capt. P. F. Fullard, M.C., Gen. List and R.F.C. (M.C. gazetted in this Gazette).
Temp. Capt. N. W. Webb, M.C., Gen. List and R.F.C. (M.C. gazetted Jan. 1st).
Sec. Lt. W. B. Wood, M.C., Hamps. R., and R.F.C. (M.C. gazetted Sept. 17th).

The Military Cross.

Sec. Lt. R. B. Ashcroft, Notts and Derby R., Spec. Res. and R.F.C.
Temp. Sec. Lt. N. E. Barraclough, Gen. List and R.F.C.
Temp. Capt. A. Bell-Irving, Gen. List and R.F.C.
Capt. R. B. Bourdillon, R.F.C., Spec. Res.
Capt. A. Boyd., Sea. Highrs.
Temp. Lt. A. Boyle, Gen. List and R.F.C.
Sec. Lt. G. T. W. Burkett, R.F.C., Spec. Res.
Temp. Sec. Lt. R. M. Burnand, Gen. List and R.F.C.
Sec. Lt. (temp. Lt.) J. Cairns, R.E. and R.F.C.
Lt. (temp. Capt.) C. F. Collett, R.F.C., Spec. Res.
Temp. Lt. G. B. Crole, Gen. List and R.F.C.
Sec. Lt. W. L. Douglas, Lond. R. and R.F.C.
Sec. Lt. (temp. Lt.) R. M. D. Fairweather, High. L.I., Spec. Res. and R.F.C.
Sec. Lt. (temp. Lt.) C. D. Fellowes, R.F.C. and Yeo.
Temp. Capt. J. Fitz-Morris, Gen. List and R.F.C.
Temp. Sec. Lt. (temp. Capt.) P. F. Fullard, Gen. List and R.F.C.
Temp. Lt. F. J. Gibbs, S. Staffs R. and R.F.C.
Lt. E. Gribben, R. Ir. Rif., Spec. Res. and R.F.C.
Temp. Sec. Lt. (temp. Lt.) B. C. R. Grimwood, R.F.A. and R.F.C.
Sec. Lt. R. N. Hall, R.F.A., Spec. Res. and R.F.C.
Lt. (temp. Capt.) R. W. P. Hall, R.A.F. and R.F.C.
Sec. Lt. (temp. Capt.) H. R. Harker, R.F.C., Spec. Res.
Sec. Lt. (temp. Capt.) S. G. Hodges, Wilts R. and R.F.C.
Temp. Sec. Lt. S. Jolley, Gen. List and R.F.C.
Lt. F. Leathley, R. Innis. Fus. and R.F.C.
Sec. Lt. (temp. Lt.) G. M. Lees, R.G.A. and R.F.C.
Temp. Sec. Lt. T. A. M. S. Lewis, Gen. List and R.F.C.
Lt. R. A. Maybery, Lrs. and R.F.C.
Temp. Capt. W. A. McClatchie, Gen. List and R.F.C.
Sec. Lt. D. U. McGregor, R.F.C., Spec. Res.
Capt. W. T. Molesworth, R. Mun. Fus. and R.F.C.
Lt. (temp. Capt.) K. D. P. Murray, R.F.C., Spec. Res.
Temp. Sec. Lt. A. R. H. Noss, Gen. List and R.F.C.
Sec. Lt. C. S. O'Grady, R.F.C., Spec. Res.
Sec. Lt. K. R. Park, R.F.A. and R.F.C.
Temp. Sec. Lt. A. A. N. Pentland, Gen. List and R.F.C.
Temp. Sec. Lt. L. A. Powell, Glouc. R., attd. R.F.C.
Sec. Lt. C. K. Smith, R.F.C., Spec. Res.
Lt. G. K. Smith, Gen. List and R.F.C.
Temp. Sec. Lt. R. D. Starley, Gen. List and R.F.C.
Temp. Lt. J. A. Stevenson, Gen. List and R.F.C.
Temp. Sec. Lt. R. N. Treadwell, Gen. List and R.F.C.
Lt. (temp. Capt.) F. McD. C. Turner, R.F.C., Spec. Res.
Temp. Lt. W. Wallace, Gen. List and R.F.C.
Temp. Sec. Lt. C. W. Warman, Gen. List and R.F.C.
Sec. Lt. G. A. Wells, R.F.C., Spec. Res.
Lt. (temp. Capt.) H. D. Williams, R.F.C., Spec. Res.
Temp. Sec. Lt. E. Wilson, Gen. List and R.F.C.
Temp. Lt. (temp. Capt.) H. W. Woolett, Gen. List and R.F.C.
Sec. Lt. A. C. Youdals, R.F.C.
Canadian Force.—Lt. D. L. Burgess, Infy., attd. R.F.C.

* * *

The following is among the decorations and medals awarded by the Allied Powers at various dates to the British Forces for distinguished services rendered during the course of the campaign:—

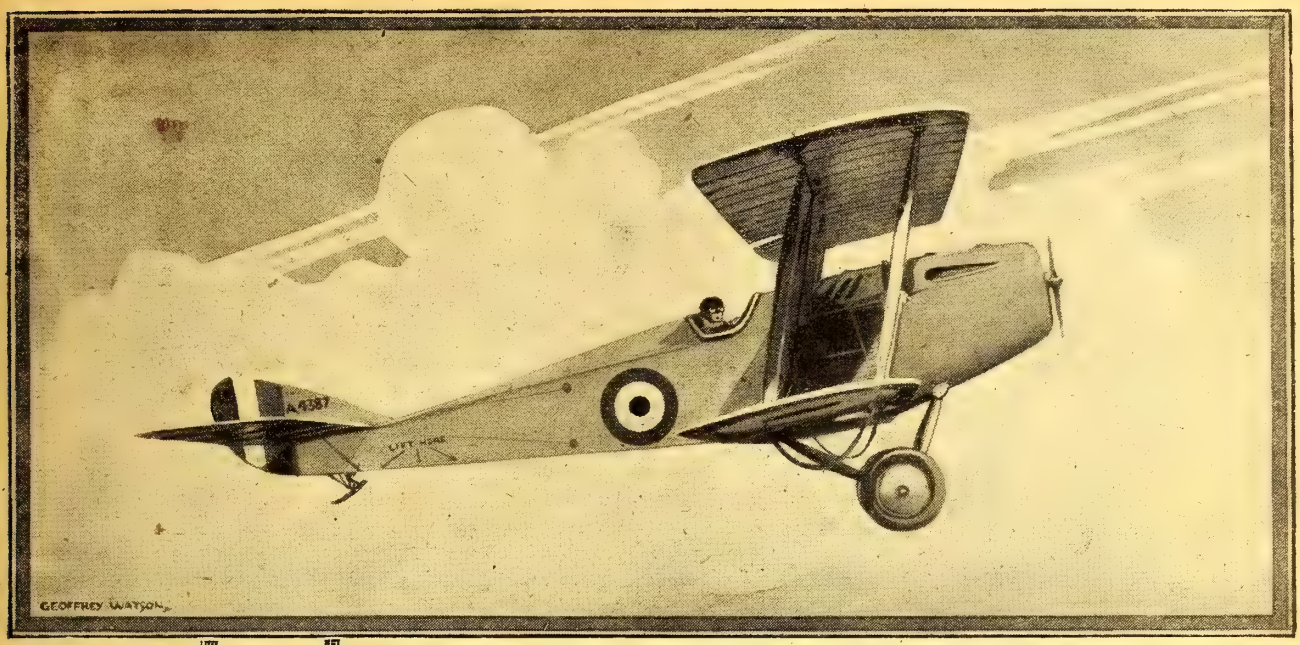
Presented by the President of the French Republic.
Croix de Guerre.

Lt. (temp. Capt.) L. J. Bayly, R.G.A. and R.F.C.

War Office, Sept. 27th.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing.—Flt. Comdr.—Sec. Lt. K. R. Park, M.C., R.A., from a Flyg. Officer, and to be temp. Capt. whilst so empld., Sept. 11th.

Spec. Appts.—(Graded as Flt. Comdrs. whilst holding the appt.).—Lt. A. G. Henshaw, Canadian Gen. List, from a Flying Officer and to be temp. Capt. while so empld., July 30th.







MARTINSYDE

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S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

Lt. (temp. Capt.) E. G. Landon, Spec. Res., from a Flt. Comdr., and to retain his temp. rank whilst so empld., Aug. 4th.

Instr. in Gunnery.—(Graded as an Equipment Officer, 1st Cl.).—Temp. Lt. B. D. Capper, Gen. List from an Asst. Instr. in Gunnery (graded as an Equipment Officer, 2nd Cl.), and to be temp. Capt. whilst so empld., Sept. 4th.

Balloon Co. Comdr.—(Graded as a Flt. Comdr.).—Temp. Capt. H. V. Knox, Gen. List, from a Balloon Comdr (graded as Balloon Officer), Aug. 14th.

War Office, Sept. 28th.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing.—Staff Officer, 3rd Cl.—(Graded as a Staff Capt.).—The date of the appt. of Lt. (now Capt.) A. J. W. Barmby, York R., is July 14th, and not as in the "Gazette" of Sept. 11th.

Flt. Comdrs.—From Flying Officers and to be temp. Capts. whilst so empld. :—Temp. Lt. D. W. Clappen, Gen. List, Sept. 11th. Sec. Lt. C. G. O. MacAndrew, Yeo. T.F., Sept 12th; the appt. of Capt. E. A. de Pass, Yeo. T.F., notified in the "Gazette" of July 4th, is antedated to May 16th.

Balloon Co. Comdr.—(Graded as a Flt. Comdr.).—Temp. Lt. V. D. Drury, R.E., from a Balloon Comdr. (graded as a Balloon Officer), and to be temp. Capt. whilst so emp'd., Aug. 14th.

Special Appt.—(Graded as a Park Comdr.).—Temp. Capt. A. H. S. MacCallum, Gen. List, from an Equipment officer, 1st Cl., and to be temp. Maj. whilst so empld., Aug. 17th.

Equipment Officers, 1st Cl.—Maj. T. O. H. Lees, R. Mar. L.I., Aug. 1st. And to be temp. Capts. whilst so empld.—Sec. Lt. (temp. Lt.) A. C. Day, Spec. Res., from a special appt. (graded as an Equipment Officer, 2nd Cl.), Aug. 17th. Lt. T. G. Mellanby, Spec. Res., from the 2nd Cl., Sept. 12th.

* * *

The King has been graciously pleased to award the Military Medal for bravery in the Field to the following Non-commissioned Officers and Men :—

869 Q.M.-Sgt. W. W. Clark, R.F.C. (Wanstead).
2866 Sgt. L. A. Herbert, R.F.C. (Richmond).
1st Cl. Air Mech. P. F. Hooker, R.F.C. (Maidstone).
182 1st Cl. Air Mech. C. E. Hyde, R.F.C. (Malton).
393 Cpl. J. P. Powell, R.F.C. (Market Drayton).
2797 Cpl. L. Van Schaick, R.F.C. (St. Helens).

War Office, Sept. 29th.

Regular Forces.—Establishments.—R.F.C., Mil. Wing.—The following appts. are made : —Flight Comdrs.—From Flying Offrs., and to be temp. Capt. whilst so empld. :—Temp. Sec. Lt. E. R. Pennell, Gen. List (Sept. 1st); Temp. Lt. G. B. Crole, Gen. List (Sept. 13th); Temp. Lt. F. J. Gibbs, S. Staff. R. (Sept. 15th).

Park Comdr.—Tempt. Capt. G. H. Padley, Gen. List, from Equipment Offr., 1st Cl., and to be temp. Maj. whilst so empld. (June 1st).

School of Instn.—School of Technical Training.—Comdts.—Graded as Depot Comdrs.).—Maj. (temp. Lt.-Col.) I. M. Bonham-Carter, North'd Fus., from a Comdt. (graded as a Wing Comdr.) of a School of Mil. Aeronautics, and to be temp. Col. whilst so empld. ; Temp. Capt. (temp. Maj.) L. Sadler, A.S.C., from an Inspr. of Technical Training (graded as a Park Comdr.), and to be temp. Lt.-Col. whilst so empld. (Sept. 10th).

Asst. Comdt.—(Graded as a Park Comdr.).—Capt. H. L. Nixson, R. Lanc. R., Spec. Res., to be secd., and to be temp. Maj. whilst so empld. (Sept. 10th).

Oversea Contingents.—Canada.—Tempt. Lt. to be temp. Capt. :—Actg. Maj. E. H. Paquin, and to bemain secd. for duty with R.F.C. (Oct. 6th, 1916).

War Office, Oct. 1st.

Regular Forces.—Establishments.—R.F.C., Mil. Wing—Ft. Comdrs.—From Flying Officers, and to be temp. Capts. whilst so empld. 14th Sept., 1917 : Lt. W. F. Anderson, Spec. Res. ; Temp. 2nd Lt. W. H. N. Shakespeare, Gen. List ; 2nd Lt. (temp. Lt.) J. B. Walmsley, Ind. Inf. 15th Sept., 1917.

Special Appointments.—(Graded as Park Comdrs whilstl holding special appts., and to be temp. Majors whilst so empld.) : Lt. (temp. Capt.) V. W. Eyre, Spec. Res., from an Equipment Officer, 1st Cl. 15th Aug., 1917. 2nd Lt. (temp. Capt.) J. McCrae, Sea H., from an Equipment Officer, 1st Cl. 27th Aug., 1917. Temp. Capt. R. de Sarigny, Gen. List, from a Special Appt. (graded as Equipment Officer, 1st Cl.). 6th Sept., 1917.

Graded as Equipment Officers, 1st Cl., whilst holding special appts.—Temp. Lt. (temp. Capt.) J. Stewart, R. Sc. Fus., from an Adj., and to retain his temp. rank whilst so empld. 1st Sept., 1917 : Lt. (temp. Capt) A. T. Dawson, R.F.A., T.F., to be secd., and to retain his temp. rank whilst so empld. 5th Sept., 1917. Temp. 2nd Lt. A. F. Livingstone, Gen. List, from a Flying Officer, and to be temp. Capt. whilst so empld. 7th Sept., 1917.

Admiralty, Oct. 1st.

The King has been pleased to approve of the award of the following honours, decorations, and medals to Officers and Men of the Royal Naval Air Service :—

(1) For services on patrol duties and submarine searching in Home Waters :—

Distinguished Service Order.

Wing Comdr. R. P. Ross, R.N. ; Actg. Comdr. O. H. K. Maguire, R.N.

Bar to the D.S.O.

Wing Comdr. A. W. Bigsworth, D.S.O., R.N.

Distinguished Service Cross.

Flt. Comdr. G. F. Breese, R.N.A.S. ; Flt. Comdr. A. Q. Cooper, R.N.A.S. ; Flt. Comdr. J. S. Wheelwright, R.N.A.S. ; Flt. Comdr. J. G. Struthers, R.N.A.S. ; Flt. Comdr. C. Maclaurin, R.N.A.S.

Flt. Lt. J. A. Carr, R.N.A.S. ; Flt. Lt. J. W. Walker, R.N.A.S. ; Flt. Lt. C. S. Colston, R.N. ; Flt. Lt. J. F. Dixon, R.N.A.S. ; Flt. Lt. A. S. Elliott, R.N.A.S.

Flt. Sub-Lt. T. G. C. Wood. R.N.A.S. ; Flt. Sub-Lt. W. J. de Salis, R.N.A.S. ; Flt. Sub-Lt. A. L. Sims, R.N.A.S. ; Flt. Sub-Lt. H. M. Morris, R.N.A.S.

Bar to the D.S.C.

Sqdn. Comdr. F. J. Rutland, D.S.C., R.N.A.S.

Distinguished Service Medal.

Air Mech., 1st Gr., J. M. Quail, O.N. F.8381 ; Ldg. Sea. H. G. Cook, O.N. 230789 (Po.) (now Warrt. Officer, 2nd Gr.) ; E.R.A., 3rd Cl., W. F. Shaw, O.N. 271948 (Po.) ; Air Mech., 1st Gr., A. J. Redman, O.N. F.7470 ; Air Mech., 2nd Gr., W. R. Liddiard, O.N. F. 13497 ; C.P.O., Mech., 3rd Gr. (E.), J. G. Cockburn, O.N. F.8627 ; Air Mech., 1st G. (E.), E. McCormack, O.N. F.8678 ; A.C., 2nd Gr., D. A. Thomas, O.N., F.17436 ; Air Mech., 1st Gr., C. Harrison, O.N. F.9484 ; P.O. Mech. E. E. Turner, O.N. F.364 ; C.P.O. N. B. Holmes, R.N.R., O.N 302 WTS. ; Ldg. Mech., T. B. Thompson, O.N. J.13350 ; Air Mech., 1st Gr., W. Fairnie, O.N. F.11069 ; P.O. Mech. H. Say, O.N. F.3212 ; C.P.O. Mech., 3rd Gr., G. Jarrett, O.N. F.2588 ; C.P.O. Mech., 2nd Gr., J. Smith, O.N. F.4200 ; C.P.O. Mech., 3rd Gr., J. M. Beard, O.N. F.618 ; Air Mech., 2nd Gr., G. L. Wright, O.N. F.9964 ; Air Mech., 2nd Gr., H. M. Lewis, O.N. F.8525 ; Air Mech., 2nd Gr., D. A. Alderton, O.N. F.13047 ; Air Mech., 2nd Gr., C. Turl, O.N F.9807 ; C.P.O. Mech., 2nd Gr., W. E. Bradley, O.N. F.3646 ; Act. Air Mech., 1st Gr., H. D. Gregory, O.N. F.8820 ; W.T.Op. A. K. Wise, R.N.R., O.N. 389 WTS. ; Act. Air Mech., 1st Gr., C. M. M. McCarthy, O.N. F.13474 ; Air Mech., 2nd Gr., J White, O.N. F.10369 ; Ldg. Mech. G. H. Daly, O.N. F.5120 ; P.O. Mech. C. P. Ltchfield, O.N. F.3630 ; Ldg. Mech. T. N. Bore, O.N. F.3616 ; Air Mech., 2nd Gr., S. A. Jefferies, O.N. F.5783 ; Ldg. Air Mech. N. H. Jenkins, O.N. F.3663 (now Prob. Obs. Officer, R.N.A.S.).

Bar to the D.S.M.

G.P.O. Mech., 3rd. Gr., V. F. Whatling, O.N. 238581 (Ch.).

Mentions in Dispatches.

The following officers and men have been mentioned in dispatches :—

Wing. Comdr. F. L. M. Boothby, R.N. ; Wing Comdr. J. N. Fletcher, R.N.A.S. ; Sqdn. Comdr. C. R. Finch-Noyes, R.N. ; Sqdn. Comdr. J. W. O. Dalgleish, R.N. ; Sqdn. Comdr. L. Tomkinson, R.N.

Flt. Comdr. E. B. Beauman, R.N.A.S. ; Flt. Comdr. I. H. B. Hartford, R.N.A.S. ; Flt Comdr. G. E. Livock, R.N.A.S. ; Flt. Comdr. F. G. D. Hards, D.S.C., R.N.A.S. ; Flt. Comdr. W. H. Watt, R.N.A.S. ; Flt. Comdr. J. B. Cole-Hamilton, R.N. ; Act. Flt. Comdr. A. Durstan, R.N.A.S

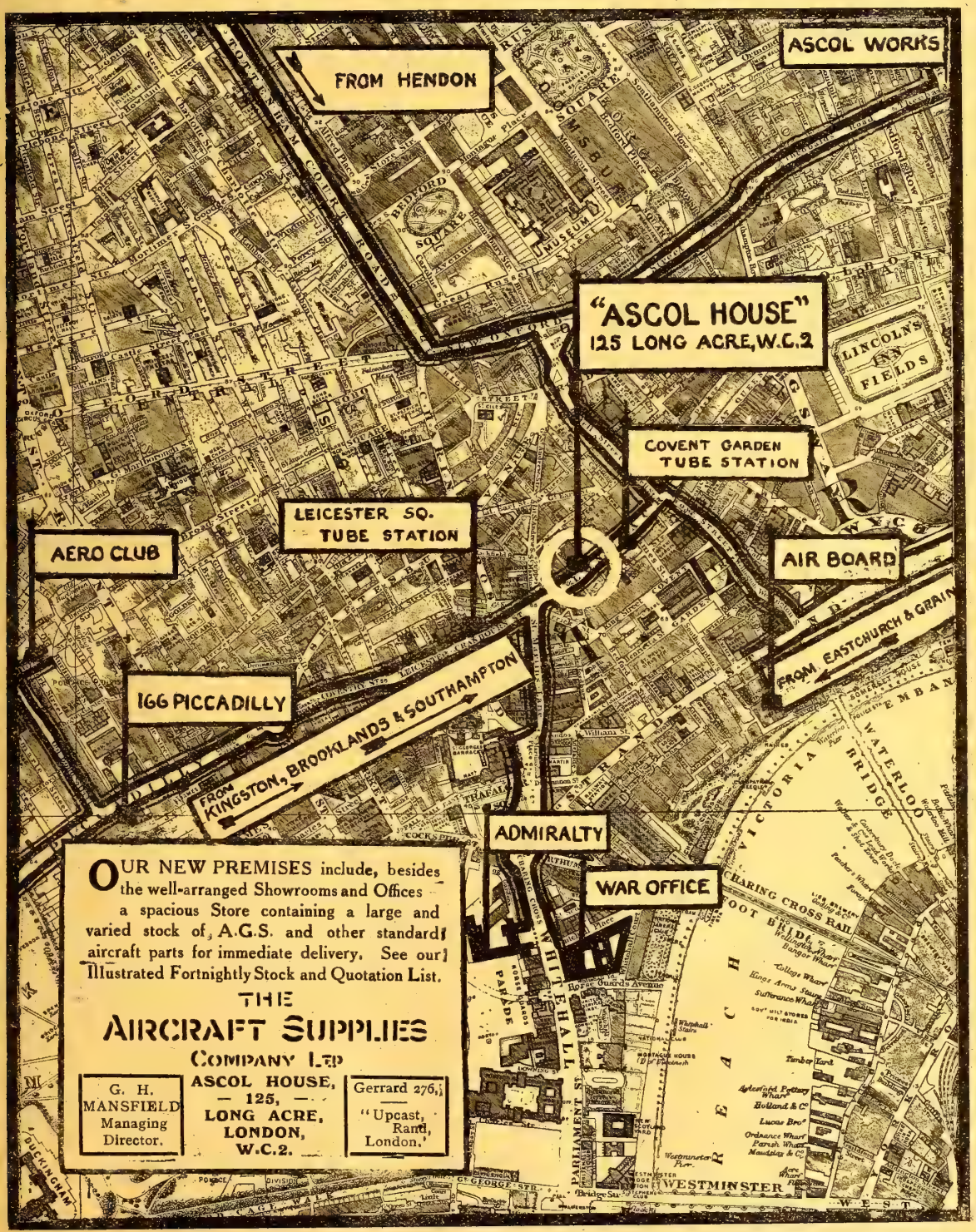
Flt. Lt. J. A. Barron, R.N. ; Flt. Lt. E. R. H. Turnour, R.N. ; Lt. J. M. Burke, R.N.V.R. ; Flt. Lt. H. A. Pailthorpe, R.N.A.S. (since killed) ; Flt. Lt. C. J. Hallinan, R.N.A.S. ; Flt. Lt. C. W. Scott, R.N.A.S. ; Flt. Lt. S. E. Taylor, R.N.A.S. ; Flt. Lt. G. F. Meager, R.N.A.S. ; Flt. Lt. T. H. Newton, R.N.A.S. ; Flt. Lt. J. O. Galpin, D.S.C., R.N.A.S. ; Flt. Lt. G. R. Hodgson, R.N.A.S.

Flt. Sub-Lt. F. S. Mills, R.N.A.S. ; Flt. Sub-Lt. K. G. Boyd, R.N.A.S. ; Flt. Sub-Lt. H. L. F. McLean, R.N.A.S. ; Flt. Sub-Lt. F. H. McMaster, R.N.A.S. ; Flt. Sub-Lt. C. S. Iron, R.N.A.S. ; Flt. Sub-Lt. W. F. Dickson, R.N.A.S. ; Obs. Sub-Lt. D. S. Earp, R.N.A.S.

C.P.O. Mech., 2nd Gr., J. Wrigley, O.N. F.469 ; C.P.O. Mech., 2nd Gr., H. T. Duke, O.N. F.17272 (now Warrt. Offr., 2nd Gr.) ; C.P.O. Mech., 3rd. Gr., R. W. Johnson, O.N. 13837 (Po.) ; C.P.O. Mech., 2nd Gr., W. Godfrey, O.N. 230931 (Po.) ; C.P.O. Mech., 2nd Gr., J. Rodger, O.N. M.2435 (Ch.) ; Air Mech., 1st Gr., R. Reekie, O.N. F. 8923 ; Ldg. Mech., 1st Gr. (E.), G. I. Smith, O.N. F.3501 ; C.P.O. Mech., 3rd. Gr., H. D. Lane, O.N. F.692 ; Boy Mech. C. Kidd, O.N. F.5004 ; Ldg., Mech. R. Connor, O.N. F.4597 ; C.P.O. Mech., 3rd Gr., G. E. Franklin, O.N. 239138 ; C.P.O. Mech., 2nd Gr., A. J. Corbett, O.N., F.54 (now Warrt. Offr., 2nd Gr.) ; P.O. Mech. J. W. Long, O.N. K.2075 (Po.) ; P.O. Mech. C. Regan, O.N. 218371 (Dev.) ; Ldg. Mech., G. H. Ellis, O.N. F.3423 ; Ldg. Mech. T. W. Thirlwall, O.N. F.9430 ; Air Mech., 2nd Gr., F. Jones, O.N. F.5785 ; C.P.O. Mech., 3rd Gr., T. O. Oakes, O.N. 238732 (Ch.) ; Ldg. Mech. J. E. Lawrence, O.N., F.8762 ; Air Mech., 1st Gr., D. McKenzie, O.N. F.760 ; Ldg. Mech. H. Lee, O.N. F.3239 ; Ldg. Mech. E. B. Turner, O.N. F.3509 ; Air Mech., 2nd Gr., J. E. Martin, O.N. J.34105 ; C.P.O. Mech., 3rd Gr., W. Morgan,

PARTS FOR TRADE MARK ASCOL REGISTERED AIRCRAFT!

ALL ROADS LEAD TO ASCOL HOUSE!



THE HUB OF THE INDUSTRY!

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

O.N. M.2399 (Dev.); P.O. Mech. B. F. Strand, O.N. F.344; C.P.O. Mech., 3rd Gr., H. E. Bennell, O.N. 234260 (Ch.); C.P.O. Mech., 3rd Gr., H. J. Richer, O.N., F.303; Air Mech. 2nd Gr., E. C Carter, O.N. F.9726; Ldg. Mech. A. H. Gaunt, O.N. F.785; P.O. Mech. S J. Heath, O.N. 201503 (Po.); Ldg. Mech. S. J. Leith, O.N. F.3516; C.P.O. F. S. Close, R.N.R., O.N. 326 WTS; Air Mech., 2nd Gr., D. T. Williams, O.N. F.6537; Air Mech., 1st Gr. (E.), W. L. Le Maitre, O.N. F.3937; P.O. Mech. L. Stokes, O.N. F.3346; Air Mech., 1st Gr., F. V. Griffin, O.N. F.12487; Ldg. Mech. W. J. Baker, O.N. F.5926; Air Mech., 2nd Gr., G. H. Windsor, O.N. F.8790; Ldg. Mech. (E.) F. W. Avery, O.N. F.3209.

(2) For service in reconnaissance and bombing flights in the Eastern Mediterranean :—

DISTINGUISHED SERVICE ORDER.

Wing Capt. F. R. Scarlett, R.N.

BAR TO THE D.S.O.

Wing Cdr. J. R. W. Smyth-Pigott, D.S.O., R.N.; Sqdrn. Cdr. C. F. Kilner, D.S.O., R.N.A.S. (Capt., tempy. Maj., R.M.L.I.).

DISTINGUISHED SERVICE CROSS.

Sqdn. Comdr. H. Stanley-Adams, R.N.A.S.

DISTINGUISHED SERVICE MEDAL.

C.P.O. Mech., 3rd Gr., A. P. Marchant, O.N. 232250 (Ch.) (now Warrt. Officer, 2nd Gr.); Air Mech., 1st Gr. (C), H. M. Green, O.N. F.7728; Air Mech., 1st Gr., A. Carder, O.N. F.2290; Air Mech., 1st Gr., A. E. King, O.N. F.4373; C.P.O. Mech., 1st Gr., H. Earll, O.N. 340416 (Ch.); P.O. Mech. W. Smith, O.N. F.2096; Air Mech., 1st Gr. (E), H. W. Wright, O.N. F.2449; Air Mech., 1st Gr., W. E. Jones, O.N. 217874 (R.F.R., Ch./B5242) (prisoners of war).

MENTIONS IN DISPATCHES.

The following Officers and Men have been mentioned in dispatches :—

Sqdn. Comdr. E. H. Dunning, D.S.C., R.N.A.S. (since killed); Flt. Comdr. E. T. Bradley, R.N.A.S.

Flt. Lt. E. P. Hicks, R.N.A.S.; Air Mech., 1st Gr., F. E. Downs, O.N. F.6091; C.P.O. Mech., 2nd Gr., R. A. Wells, O.N., F.531; C.P.O. Mech., 3rd. Gr., L. D. Stewart, O.N. F.229; Ldg. Mech. E. H. Purdy, O.N. F.1494; C.P.O. Mech., 2nd. Gr., E. Whittlesea, O.N., 344343 (Ch.) (now Warrt. Officer, 2nd Gr.); C.P.O. Mech., 2nd Gr., C. Parsons, O.N. F.205; C.P.O. Mech., 3rd. Gr., G. Lambourne, O.N. 351591 (Po.) (now Warrt. Officer, 2nd Gr.).

FROM THE COURT CIRCULAR.

BUCKINGHAM PALACE, Sept. 26th.

The following Officers also had the honour of being received by the King, when His Majesty invested them with the Insignia of Companions of the Order into which they have been admitted :—

THE DISTINGUISHED SERVICE ORDER AND THE DISTINGUISHED SERVICE CROSS.

Flt. Comdr. Herbert Brackley, R.N.A.S.

THE DISTINGUISHED SERVICE ORDER.

Lt.-Col. Percival Wise, Royal Warwickshire Regt. and R.F.C.

* * *

The King then conferred Decorations as follows :—

THE MILITARY CROSS.

Lt. Hamilton Blofeld, R.F.C.
Capt. William Buckingham, R.F.C.
Caapt. Edmund Cahusac, South Staffordshire Regt. and R.F.C.
Capt. William Thomas, Gen. List and R.F.C.
Capt. Lewis White, Gen. List and R.F.C.
Lt. Wilfred Cox, Gen. List and R.F.C.
Lt. Archie Lutyens, R.F.C.
Sec. Lt. Maurice Benjamin, R.F.C.
Sec. Lt. Thomas Luke, R.E. and R.F.C.
Sec. Lt. Herbert Tansley, K.R.R. Corps, attd. R.F.C.

His Majesty subsequently proceeded to the Forecourt of the Palace, and decorated (amongst others) the following with the Victoria Cross :—

Sec. Lt. Gilbert Insall, R.F.C.

For most conspicuous bravery, skill, and determination. He was patrolling in a Vickers Fighting Machine, with First Class Air Mechanic T. H. Donald as gunner, when a German machine was sighted, pursued and attacked. The German pilot led the Vickers machine over a rocket battery, but, with great skill, Lt. Insall dived and got to close range, when Donald fired a drum of cartridges into the German machine, stopping its engine. The German pilot then dived through a cloud, followed by Lt. Insall. Fire was again opened, and the German machine was brought down heavily in a ploughed field. On seeing the Germans scramble out of their machine and prepare to fire Lt. Insall dived to 500 ft., thus enabling Donald to open heavy fire on them. The Germans then fled, one helping the other, who was apparently wounded. Other Germans then commenced heavy fire, but in spite of this, Lt. Insall turned again, and an incendiary bomb was dropped on the German machine, which was last seen wreathed in smoke. Lt. Insall then headed west in order to get back over the German trenches, but as he was at only 2,000 ft. altitude he dived across them for greater speed, Donald firing into the trenches as he passed over. The German fire, however, damaged the petrol tank, and, with great coolness, Lt. Insall landed under cover of a wood 500 yards inside our lines. The Germans fired some 150 shells at our machine on the ground, but without causing material damage. Much damage had, however, been caused by rifle fire, but during the night it was repaired behind screened lights, and at dawn Lt. Insall flew his machine home with First Class Air Mechanic T. H. Donald as a passenger.

* * *

BUCKINGHAM PALACE, Sept. 27th.

The King held an Investiture of the Most Excellent Order of the British Empire at 10.30 o'clock this morning.

The following were severally introduced into the presence of the Sovereign, when the King invested them with the Insignia of the respective Divisions of the Order into which they have been admitted :—

KNIGHTS GRAND CROSS.

THE LORD SYDENHAM.

COMMANDERS.

Mr. Leonard Bairstow. Lieut.-Colonel Henry Fowler.

* * *

Lieut.-General Sir David Henderson (Director-General of Military Aeronautics), and Lieut. G. F. Knight (Devonshire Regiment, attached Royal Flying Corps), had the honour of being received by the King.

NAVAL.

ADMIRALTY COMMUNIQUÉS.

SEPT. 25th.—During the morning of the 24th instant a bombing raid was made by naval aircraft on Varssenaere (three miles south-west of Bruges) aerodrome. A large number of bombs were dropped, mostly falling among the sheds and hangars, and also among the aeroplanes lined up on the aerodrome.

On the same day a fighter patrol met a large formation of Albatros scouts, and one enemy machine was destroyed and another driven down completely out of control.

All our machines returned safely.

SEPT. 26th.—A bombing raid was carried out by the Royal Naval Air Service at noon on September 25th on Sparappelhoek.

Several direct hits were reported, and smoke was observed from sheds on the south-west side of the aerodrome. Many bombs were dropped.

During the day our fighter patrols over the Fleet encountered six hostile seaplanes, two of which were driven down.

A bombardment of the naval establishments at Ostend was carried out by our naval forces during the afternoon, and several hits were observed on the Atelier de la Marine.

SEPT. 27th.—A bombing raid was carried out by naval aircraft to-day on St. Denis Westrem aerodrome.

Bombs were dropped on sheds and on fifteen Gothas lined up on the aerodrome, a direct hit being observed on the latter.

All our machines returned safely.

During the night of 25th-26th the Royal Naval Air Service carried out bombing raids on the following objectives : Thourout Junction. Lichtervelde Junction. Cortemarck Junction.

Many tons of bombs were dropped, and several direct hits were made on the lines.

All our machines returned safely.

SEPT. 30th.—During the night, September 27th-28th, bombing raids by naval aircraft were made on the following objectives :—

The lock gates at Zeebrugge.

St. Denis Westrem Aerodrome (south-west of Ghent).

Gontrode Airship Shed (south-east of Ghent).

Houttave Aerodrome (about 13 miles east of Ostend).

The bomb dropping at Zeebrugge appeared good, while at Houttave the bombs fell among hangars and huts on the south-west side of the aerodrome. In all seven tons of explosives were dropped.

All machines returned safely.

During the afternoon of September 29th a bombing raid was carried out by naval aircraft on St. Denis Westrem aerodrome. Many bombs were dropped and direct hits were observed among sheds and Bessonneaux tents. A bomb exploded amongst five machines lined up on the aerodrome.

All machines returned safely.

A bombing raid was carried out on September 27th by naval aircraft on storehouses, etc., on the south-western side of Beirut harbour (on the Syrian coast).

Many direct hits were obtained, and fires were started.

It was observed that damage caused to sheds as a result of the raid on August 18th was in course of repair.

All our machines returned safely.

The storehouses on the mole were afterwards shelled by a cruiser and set on fire.





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Oct. 1st.—During the night of September 29th bombing raids were carried out by naval aircraft over the following objectives:

The lock gates at Zeebrugge.

St. Denis Westrem Aerodrome.

Thourout Aerodrome.

Brugeoise works and trains.

Several tons of bombs were dropped with good results, a large fire being caused at St. Denis Westrem Aerodrome.

During patrol several aerial combats occurred, with the result that two enemy machines were destroyed, and one was driven down completely out of control

A Gotha was also driven down, and it is thought to have been damaged.

All our machines returned safely.

The Casualty List.

Reported Sept. 27th.

Wounded.—Harrower, Flt. Sub-Lt. G. S., R.N.

Johnston, Flt. Sub-Lt. W. C., R.N.

Accidentally Injured.—Stauffer, Prob. Flt. Officer J. S., R.N.

Reported Sept. 28th.

Died of Injuries.—Lockie, Prob. Flt. Officer K., R.N.

Missing.—Phillips, Flt. Sub-Lt. A. W., R.N.

Foster, Flt. Sub-Lt. E., R.N.

Wounded.—Fisher, Actg. Flt. Comdr. P. S., D.S.C., R.N.

Jordan, Flt. Sub-Lt. W. L., R.N.

Previously reported Missing, believed Killed, now reported Killed.—Woodhouse, Flt. Sub-Lt. M. G., R.N.

Reported Sept. 29th.

Wounded.—MacDonald, Flt. Sub-Lt. A. F., R.N.

Reported Oct. 1st.

Missing.—Kilner, Flt. Comdr. B. D., R.N.

Akester, Flt. Sub-Lt. J. C., R.N.

Burnett, Flt. Sub-Lt. W. J., R.N.

Ingleson, Flt. Sub-Lt. W., R.N.

de Wilde, Flt. Sub-Lt. J. S., R.N.

Wounded.—Daly, Flt. Sub-Lt. R. H., D.S.O., R.N.

Calvert, Flt. Sub-Lt. C. W. L., R.N.

Slightly Injured.—Meredith, Proby. Flt. Officer E., R.N

Previously reported Missing, now reported Prisoner.—Hall, Flt. Sub-Lt. N. D., R.N.

Lewis, Flt. Sub-Lt. A. D. M., R.N.

Reported October 2nd, 1917.

Died of Injuries.—Flight Com. John D. Newberry, R.N.

Seriously Injured.—Prob. Flight Officer Bernard J. E. Anson, R.N.

Previously reported Missing, now reported a Prisoner of War.—Flight Sub-Lieut. Harold H. Booth, R.N.

Previously reported Missing, now presumed Killed.—Flight Sub-Lieut. John J. de la T. Fox, R.N.; Mr. John Barber, Midshipman, R.N.R.

PERSONAL NOTICES.

Death.

LOCKIE.—Prob. Flt. Officer Keith Lockie, R.N., who was fatally injured in a flying accident abroad, was the younger son of the late Andrew Lockie, of Caterham, and Duns, N.B., and of Mrs. Herbert Mason of Warlingham. He was 19 years of age.

Engagement.

HYDE-THOMSON—SHARP.—The engagement is announced of Squadron-Commander Douglas Hyde Hyde-Thomson, R.N., second son of Mr. and Mrs. Robert Donald Thomson, of Pool House, Groby, Leicestershire, and Eileen Ethel, younger daughter of Mr. and Mrs. Basil Carter Sharp, of 4, Hyde Park Terrace, London, W.

Marriage.

ENGLAND—BAKER.—On Sept. 24th (very quietly, owing to mourning), at the Church of St. Mary-in-the-Boltons, South Kensington, Observer Sub-Lieut. Maurice Ord Fuller England, R.N., only son of Dr. and Mrs. G. Fuller England, Buckingham House, Winchester, was married to Evelyn Iris, elder daughter of George Baker and the late Mrs. Baker, of St. Margaret's Bay, Dover, by the Rev. P. Basil Phelps, M.A., F.R.Hist.Soc.

MILITARY.

G.H.Q. Communiqués.

Sept. 25th, 9.32 p.m.—On the 24th inst., in spite of thick mist which hung over the lines all day, our aeroplanes showed great activity. Observation for our artillery was continued, and many photographs were taken of the enemy's forward and back areas.

Four tons of bombs were dropped during the day on German aerodromes north and south of Roulers and near Cambrai, on an important railway centre east of Tournai, and upon billets and hutments round Lens and Roulers. At night an ammunition dump north of Cambria and rest billets east of Lens were also bombed.

Three enemy machines were brought down in air fighting and five were driven down out of control.

The pilot of one of the machines brought down on the 23rd inst., proved to be Lieut. Voss, who, it is claimed in the enemy communiqués, had brought down many Allied machines.

Four of our aeroplanes are missing.

Sept. 26th, 10.3 p.m.—On the 25th instant our aeroplanes were extremely active, working with our artillery and bombing and taking photographs of the enemy's forward areas and his aerodromes.

Most successful bombing raids were carried out during the day on an aerodrome and railway siding near Ghent, where a large fire was started on aerodromes, near Courtrai and Cambrai, on billets east of Lens, and on hutments south-west of Roulers.

In all five tons of bombs were dropped in these raids. A further five tons were dropped, and many thousand rounds were fired from machine-guns during the night on Menin and Wervicq and on enemy troops and transport on the roads leading from these towns to the battle front.

A great deal of fighting took place yesterday, and a record number of hostile machines were accounted for. In air fighting 17 German aeroplanes were brought down, and six were driven down out of control. In addition to these a German three-seater bombing machine was shot down last night by our anti-aircraft guns.

One of our machines is missing.

Sept. 27th, 9.24 p.m.—On the 26th inst. the weather was misty during the morning, and later in the day was overcast, with a strong west wind. In spite of this our aeroplanes were extremely active in co-operation with the artillery and infantry in the battle area. The enemy's troops in the fighting line and his reserves in rear were harassed with machine-gun fire throughout the day.

Some 30,000 rounds were fired from altitudes of 100 ft. and upwards, and many parties of German infantry were dispersed with casualties. On one occasion three of the enemy's guns were fired on while in movement. The teams of two guns bolted, and the third overturned.

Strong opposition was encountered from the enemy's fighting machines, and a very large number of combats took place at low altitudes. Heavy casualties on both sides resulted owing to the difficulty of regaining control of damaged machines when flying near the ground.

The weather prevented any extensive bombing operations during the day, but at night over two tons of bombs were dropped on the enemy's reserves in rear of the battle front.

Seven hostile machines were brought down in air fighting and three were driven down out of control. Five other hostile machines were brought down by the fire of our infantry.

Thirteen of our machines are missing.

Sept. 28th, 10 p.m.—On the 27th inst. heavy ground mist again hindered aerial work. Our aeroplanes continued to co-operate with the artillery, and many hostile areas were reconnoitred and photographed.

During the day bombs were dropped by our aviators on the enemy's aerodromes at Carnières, St. Denis Westrem, and Gontrode, on billets at Moorslede, and on other targets. At night a total of 6¾ tons of bombs were dropped on Gontrode aerodrome, where good results were obtained, on the enemy's railway stations at Rumbeke, Menin, Wevelghem, Ledeghem, and on various hostile billets and a dump.

In the course of these raids German troops and transport were successfully attacked by machine-gun fire from low altitudes.

In air fighting six German machines were brought down, while three others were driven down out of control. In addition, one hostile machine was shot down by our infantry.

One of our aeroplanes is missing.

Sept. 29th, 8.59 p.m.—On the 28th inst. artillery and photographic work was continued by our aeroplanes, and over four tons of bombs were dropped on the enemy's aerodromes at Gontrode (south-east of Ghent) and Carnières (east of Cambrai), and on hostile dumps, billets, and railways.

At night another six tons were dropped on similar targets, including the aerodrome at Gontrode, where the enemy's anti-aircraft guns, machine-guns, and searchlights were most active. In spite of the heavy barrage which was put up over the aerodrome all our machines returned safely.

During these raids our aeroplanes again used machine-gun fire with good effect against all enemy troops and transport seen.

As the result of air fighting nine German machines were brought down and four others were driven down out of control. In addition one enemy machine was shot down by our anti-aircraft guns. Three of our aeroplanes failed to return.

Sept. 30th, 9.33 p.m.—On the 29th inst. the weather was unfavourable for aerial work. A number of valuable photographs were taken, however, and some observation was carried out for the artillery.

Bombing of the enemy's aerodromes, billets, dumps, and railways was continued vigorously by our aeroplanes by day and night, and over seven tons of bombs were dropped. Gon-

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trode aerodrome was the chief target for our machines, and a large fire was caused there.

One of the enemy's balloon sheds also was set on fire and destroyed by a naval pilot.

The enemy's fighting machines were not very active yesterday, and there were comparatively few combats. One German machine was brought down, and two of our aeroplanes are missing, one of which was seen to land under control.

Oct. 1st, 9.29 p.m.—Visibility improved on September 30th, and a great deal of artillery and photographic work was accomplished by our aeroplanes.

Bombing was continued without respite by day and night, and over eleven tons of bombs were dropped on the enemy's aerodrome at Gontrode, on hostile billets and communications in the battle area, and on a dump and headquarters near Cambrai.

The enemy also carried out many bombing raids during the night, but did little damage of military importance.

A photograph taken of the results of our bombing at Gontrode aerodrome shows that on the night of September 29-30th one of the sheds at the aerodrome was hit.

The same photograph shows that three large German machines have landed in a field five miles south of Gontrode aerodrome. Two of the machines are clearly damaged, and reconnaissances carried out to-day found all three machines still lying in the field.

The large airship shed which is now used for the accommodation of Gotha aeroplanes at this aerodrome is reported to have been set on fire last night.

Enemy aircraft were not very active yesterday, but a few large formations were encountered. Four German machines were brought down and eight were driven down out of control.

Five of our aeroplanes are missing.

WAR Office Communiques.

Sept. 28th.—The G.O.C the British Forces in Macedonia reports:—

Our aeroplanes have carried out several successful bombing raids, causing damage to the enemy's trenches, camps, and battery positions.

Sept. 29th.—The G.O.C. British Forces in Mesopotamia reports: On Sept. 25th two of our aeroplanes engaged in reconnaissance on the Tigris north of Samarra failed to return.

Home Command Communiqués.

Sept. 25th, 11.45 a.m.—Latest reports concerning last night's aeroplane raid show that the group of raiders which approached London was driven off by anti-aircraft gunfire, only one, or at most two, machines penetrating the defences. The casualties in all the raided districts reported by the police up to the present are:—

Killed, 15; injured, 70.

Material damage is not great.

Enemy airships crossed the Yorkshire and Lincolnshire coasts between midnight and 3 a.m., but there is no evidence of their having penetrated to any distance inland. They were driven off by gunfire from various defended localities which they attempted to approach.

Bombs were dropped at one coast town, three women being slightly injured.

Little material damage was caused.

Sept. 25th, 9.40 p.m.—The Thames Estuary was again the objective of a hostile air raid this evening. The Kent and Essex coast was crossed at various points and a few bombs were dropped. No casualties have yet been reported.

One raider penetrated as far as the South-Eastern outskirts of London, where two bombs fell, causing some 20 casualties.

Sept. 26th, 11.30 a.m.—Latest reports show that the first group of raiders which approached London last night were turned back by gunfire, not more than two machines actually penetrating the defences. These machines dropped a number of bombs in the south-eastern outskirts of London at about 7.45 p.m., which damaged some dwelling houses killing six and injuring 16 persons.

A second group of raiders which approached London half an hour later were driven off.

Bombs were dropped in various localities in south-east England; up to the present no casualties or damage have been reported.

Later Report.—The latest police reports show that in last night's air raid seven persons were killed and 25 injured in all districts.

Sept. 28th, 10.40 p.m.—Hostile aeroplanes attacked the South-East Coast this evening.

Raiders were reported from various points along the coast of Suffolk, Essex, and Kent.

The majority of the raiders did not venture far inland; a few of them headed towards London, but failed to reach the Metropolis.

Bombs have been dropped in Suffolk, Essex, and Kent.

No reports as to casualties or damage have yet been received.

Sept. 29th, 11.30 a.m.—Latest reports indicate that about 20 enemy machines participated in last night's raid. Repeated attacks were made upon London, but in no case did the raiders penetrate the outer defences.

Bombs were dropped in a number of places in Kent, Essex, and Suffolk, but no casualties and only insignificant damage have been reported up to the present.

One enemy aeroplane is reported to have been shot down in the Thames Estuary and a second off the coast.

Sept. 29th, 10.30 p.m.—Hostile aeroplanes crossed the coasts of Kent and Essex in groups between 8 and 9 p.m.

Several attacks were made upon London and some bombs were dropped in the north-eastern and south-eastern districts.

Bombs were also dropped at various places in Kent and Essex.

No reports of casualties or damage have yet been received.

Sept. 30th, 12 noon.—Latest reports show that a determined and simultaneous attack was made upon London by three groups of raiders. Each of these groups, which approached from different directions, were broken up by anti-aircraft gunfire, and only two or at most three machines penetrated the defences. Bombs were dropped in the north-eastern and south-eastern districts.

A fourth group of enemy machines which attempted to approach London later was driven off, none of the raiders penetrating the outer defences of the capital.

Bombs were also dropped at various places in Kent and Essex.

Full reports of casualties and damage have not yet been received, but both are believed to be comparatively light.

Sept. 30th, 4 p.m.—Police reports state that the casualties in last night's air raid in all districts visited by enemy aeroplanes were:—

Killed	11
Injured	82

Material damage was not great.

Sept. 30th, 9.30 p.m.—Two groups of enemy machines, followed by others flying singly, crossed the Kent and Essex coast between 6.40 and 8 p.m.; they came towards London.

About 10 penetrated the outer defences, but only four or five got through to London itself.

Bombs are reported to have been dropped in Kent and Essex and also in London.

No details as to casualties or damage have yet been received.

Oct. 1st, 1 p.m.—Latest reports state that the casualties in last night's air raid in all districts were:

Killed	9
Injured	42

Only two persons were killed in London.

Material damage was not great.

One enemy machine is reported to have been brought down off Dover.

10.25 p.m.—A group of hostile aeroplanes crossed the Essex Coast about 7 p.m and proceeded across Essex towards London. This group of machines was followed at about a quarter of an hour's interval by a second, which pursued the same course.

The first attack on London was delivered from the North-East at about 7.45 p.m. Most of the raiders were turned back, but one or more machines penetrated the defences, and dropped bombs in the South Western district at about 8.15 p.m.

The second group of raiders attempted to cross the defences at various points in the North-East and North of London, but without success until shortly after 9 p.m., when a few of the machines passed across London. Bombs were again dropped in the South-Western district.

Meanwhile a third group of raiders crossed the Kentish coast and dropped bombs at various places. This group did not penetrate far westwards.

A fourth group of enemy machines crossed the Essex Coast about 8.50 p.m., and proceeded towards London, which was approached shortly before 10 p.m. They did not penetrate farther than the North-Eastern outskirts of London, where some bombs are reported to have been dropped.

No reports of casualties or damage have yet been received.

The Casualty List.

Reported Sept. 26th.

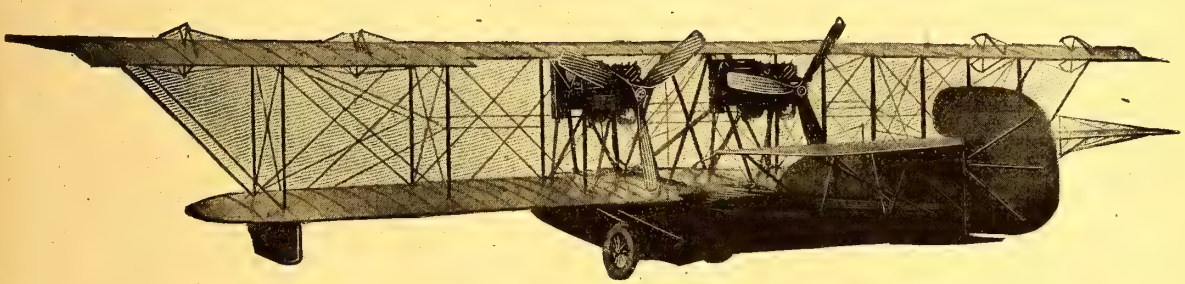
Killed.—Hodkinson, Sec. Lt. L., R. Welsh Fus., attd. R.F.C.
Lennard, Sec. Lt. E. S. R., R.F.C.
Miles, Sec. Lt. G. H., R.W. Kent R., attd. R.F.C.
Rickards, Capt. A. T., R.G.A., attd. R.F.C.
Whittall, Sec. Lt. N. C., R. Fus., attd. R.F.C.

Previously reported Missing, now reported Killed.—
Croker, Sec. Lt. F. R., Lan. Fus., attd. R.F.C.

Wounded.—Colmore, Capt. H., Hrs., attd. R.F.C.
Frost, Sec. Lt. J. E., R.F.C.

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Sheridan, Lt. J. W., R.F.C.
Simons, Sec. Lt. T. G., Northn. R., attd. R.F.C.
Thompson, Sec. Lt. S., R.F.C.
Westaway, Sec. Lt. H. W., R.F.C.

MISSING.—Crow, Sec. Lt. N. H., R.F.C.
Hammond, Sec. Lt. H. T., R.F.C.
Sen, Sec. Lt. E. S. C., R.F.C.
Taylor, Sec. Lt. S. H., R.F.C.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER IN GERMAN HANDS.—Beldam, Lt. C. H., Cambs. R. and R.F.C.

Reported Sept. 27th.

KILLED.—Brotherhood, Sec. Lt. F. R., R.F.C.
Dann, Sec. Lt. H. N. G., R.F.C.
Nutter, Sec. Lt. A. C., R.F.C.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—Hudson, Sec. Lt. T. J., R.F.C.
Margerison, Sec. Lt. T., Cyclist Bn., attd. R.F.C.
White, Lt. S. J. M., Norf. R., attd. R.F.C.

DIED OF WOUNDS.—Albury, Sec. Lt. N. H., R.F.C.
Noss, Sec. Lt. A. R. H., M.C., R.F.C.
Powney, Sec. Lt. A. J., R.F.C.

DIED.—Hofmeyr, Lt. R., Yorks L.I., attd. R.F.C.

WOUNDED.—Ashby, Sec. Lt. R. S., C. D., R.F.C.
Corry, Sec. Lt. E. B., R.F.C.
Skelton, Sec. Lt. J. E. J., R.F.C.

MISSING.—Deason, Lt. T. G., Yeo., attd. R.F.C.
Lloyd, Sec. Lt. E. E. F., Dragoon Gds., attd. R.F.C.
Tyzack, Sec. Lt. E. D., R.E., attd. R.F.C.

PREVIOUSLY REPORTED PRISONER, NOW REPORTED WOUNDED AND PRISONER IN GERMAN HANDS.—Sharpe, Lt. F., Sher. For., attd. R.F.C.

PREVIOUSLY REPORTED MISSING, NOW REPORTED WOUNDED AND PRISONERS IN GERMAN HANDS.—Davies, Sec. Lt. C. W., R.F.C.
Styles, Sec. Lt. W. B., R.F.C.
Richards, Sec. Lt. C. R., M.C., R.F.C.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONERS IN GERMAN HANDS.—Fulton, Sec. Lt. E. P., R.F.C.
Gillespie, Sec. Lt. J. W., R.F.C.
Hine, Sec. Lt. J. B., R.F.C.
Howes, Lt. W. H., R.F.C.
Kellogg, Sec. Lt. W. B., R.F.C.
O'Brien, Sec. Lt. P. A., R.F.C.
Phelan, Sec. Lt. R. S., R.F.C.
Skinner, Sec. Lt. W. R. K., R.F.C.
Tambling, Sec. Lt. H. G., R.F.C.
Thompson, Sec. Lt. S. F., Suff. R., attd. R.F.C.
Waring, Sec. Lt. H. E. A., R.F.C.
White, Sec. Lt. T. W., R.F.C.
Wright, Lt. M. T., L.N. Lanc. R., attd. R.F.C.
Young, Lt. J. G., Leins R. attd. R.F.C.

Reported Sept. 28th.

KILLED.—Humphries, Sec. Lt. L. G., R.F.C.
Rowat, Sec. Lt. R., R.F.C.

PREVIOUSLY REPORTED WOUNDED, NOW REPORTED DIED OF WOUNDS.—Wilkinson, Lt. H. R., R.F.C.

WOUNDED.—Gray, Sec. Lt. C. W. McL., R.F.C.
Steben, Sec. Lt. F. L., R.F.C.
Weller, Sec. Lt. W. H., R.F.C.

MISSING.—Goodwin, Sec. Lt. N. W., Mx. R., attd. R.F.C.
Graham, Lt. R. L., R.F.C.
Haslam, Sec. Lt. H., R.F.C.
Hawtrey, Sec. Lt. J. J. A., R.F.C.
Holman, Sec. Lt. G. C., R.F.C.
Ibbotson, Sec. Lt. H., R.F.C.
McMichael, Lt. G. B., Hereford R., attd. R.F.C.
Shadwell, Sec. Lt. L. M., R.F.C.
Skinner, Sec. Lt. A. H., R.F.C.
Taylor, Sec. Lt. R. E., R.F.C.
Wheeler, Sec. Lt. L. F., R.F.C.
Wyman, Sec Lt. J. B. H., R.F.C.

Reported Sept. 29th.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—Bird, Sec. Lt. D. J. de A., R.F.A., attd. R.F.C.

WOUNDED.—Etheridge, Sec. Lt. C. J. G., Yorks L.I., attd. R.F.C.
Simpson, Sec. Lt. J. R. M., R.F.C.
Smallman, Sec. Lt. B. S., R.F.A., attd. R.F.C.

MISSING.—Grosvenor, Sec. Lt. T., Linc. R., attd. R.F.C.
Pritchard, Sec. Lt. C. F., R.F.C.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER IN GERMAN HANDS.—Thompson, Lt. C. D., H.A.C., attd. R.F.C.

Reported Oct. 1st.

KILLED.—Manley, Capt. J., R.F.C.
Marshall-Lewis, Sec. Lt. F., R.F.C.
Wright, Sec. Lt. F. A., D. of C. L.I., attd. R.F.C.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—Blake, Sec. Lt. J. E., R.E., attd. R.F.C.
Cock, Sec. Lt. J. H., R.F.C.
Cruikshank, Capt. G. L., D.S.O., R.F.C.
Freemantle, Sec. Lt. R. P. C., R.F.C.
Grandin, Lt. R. J., A.S.C., attd. R.F.C.
Hunt, Sec. Lt. E. W. A., R.F.C.
Rowe, Lt. B. F., R. Fus., attd. R.F.C.
Smith, Sec. Lt. T. E., R.F.C.
Stonier, Lt. W. J., Bedf. R., attd. R.F.C.

WOUNDED.—Dandy, Sec. Lt. H., R.H.C.
Hepburn, Sec. Lt. A., R.F.C.
Peterkin, Sec. Lt. S. MacC., R.F.C.
Trevethan, Lt. R. M., M.C., R.F.C.
Gay, Sec. Lt. B. C., R.F.C.
Paterson, Sec. Lt. R. J., Hamps R., attd. R.F.C.

MISSING.—Chapman, Sec. Lt. A. J., R.F.C.
Golding, Lt. E., A.S.C., attd. R.F.C.
Hartnett, Lt. M. C., R. Muns. Fus., attd. R.F.C.
Humble, Sec. Lt. T., R.F.C.
McArdle, Lt. H. F., Cav., Spec. Res., attd. R.F.C.
Mumford, Lt. G. W., A.S.C., attd. R.F.C.
Oxley, Sec. Lt. M. G. M., R.F.C.
Sutcliffe, Sec. Lt. C. A., R.F.C.
Taylor, Sec. Lt. N. J., R.F.C.
Walthew, Sec. Lt. J. S., R.F.C.

Reported Oct. 2nd.

KILLED.—Devlin, Lt. H. L., Arg. and Suthd. Highrs. and R.F.C.

WOUNDED.—Bickerton, Sec. Lt. F., R.F.C.
Burrow, Sec. Lt. A. N., R.F.C.
Gardner, Capt. C. H., R.F.A., attd. R.F.C.
Turner, Sec. Lt. G. D., Welsh, attd. R.F.C.
Watts, Sec. Lt. F. P., R.F.C.
Zimmer, Lt. G. F. W. R.F.C.

MISSING.—Cornish, Sec. Lt. W. O., R.F.C.; Crowther, Sec. Lt. S. L., R.F.C.; Davis, Lt. B. R., R. Fus., attd. R.F.C.; Garratt, Sec. Lt. R. H., R.F.C.; Gray, Sec. Lt. C. G. D., R.F.C.; Nobbs, Sec. Lt. C. H. F., R.F.C.

* * *

CASUALTIES AMONG WARRANT OFFICERS, N.C.Os., AND MEN. THE DATES ARE THOSE OF THE OFFICIAL LIST.

KILLED.

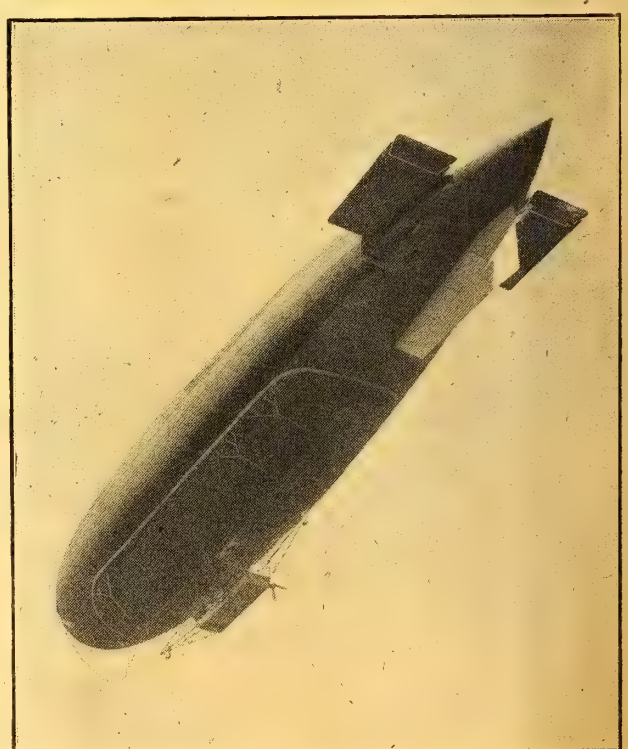
SEPT. 19th.—R.F.C.—Bestford 61923 2nd Class Air Mech. R. (Newcastle, Enlt.).

DIED OF WOUNDS.

SEPT. 18th.—R.F.C.—Harmston 65181 1st Class Air Mech. W. (Grimsby).

DIED.

SEPT. 17th.—R.F.C.—Booth 33605 2nd Class Air Mech. W.

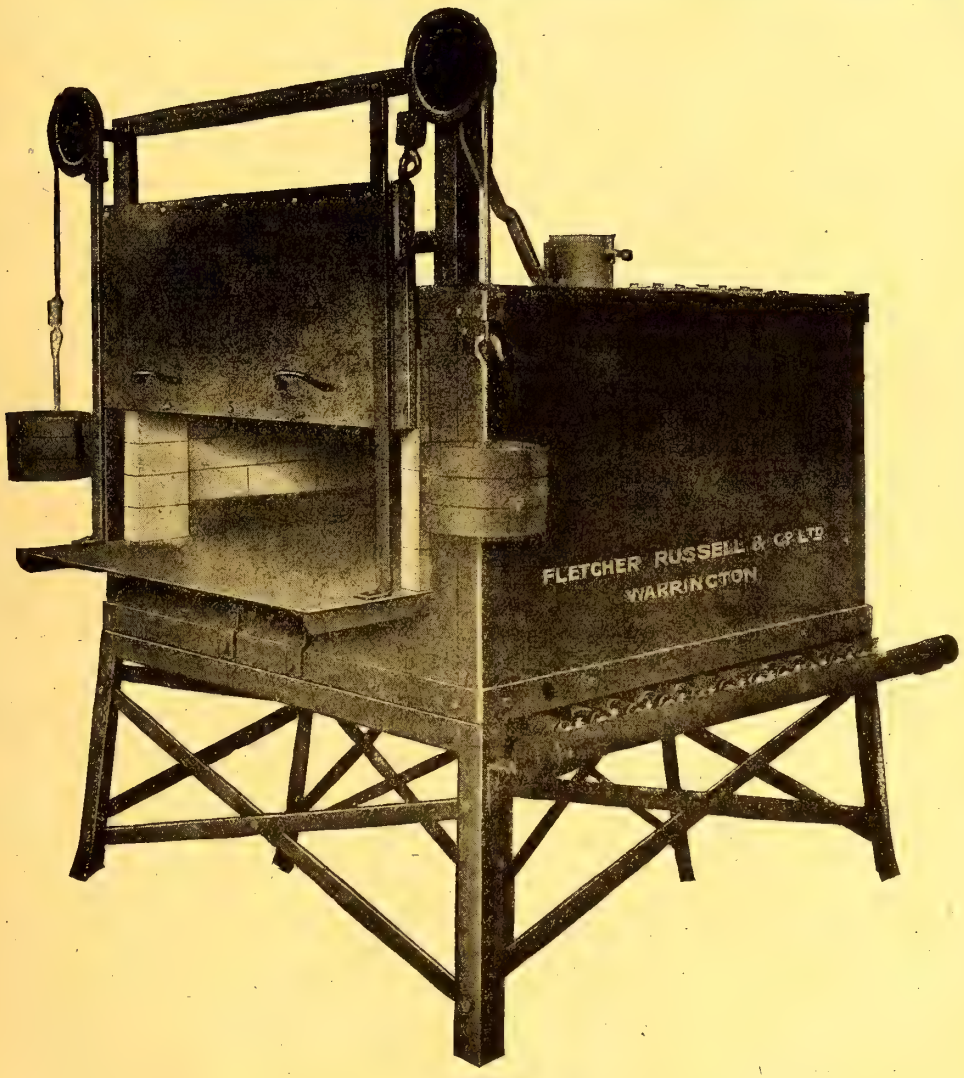


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(Bury); McCabe 51493 3rd Class Air Mech. P. (Liverpool: Wadsworth 64692 2nd Class Air Mech. R. H. (Hull).

Sept. 21st.—Walker 37319 1st Class Air Mech. T. C. (Darlington).

Wounded.

Sept 17th.—Boucher 8053 Serjt. E. V. (Westminster, S.W.); Boxall 78601 2nd Class Air Mech. S. (Strood); Brown 78600 1st Class Air Mech. G. (Belper); Panter 37687 2nd Class Air Mech. A. (Walthamstow, E.); Pike 9456 1st Class Air Mech. A. C. (Reading); Capper 7599 1st Class Air Mech. F. (Barnston); Davies 66109 2nd Class Air Mech. H. C. (Neath); Pleace 58217 2nd Class Air Mech. S. W. (Southwark, S.E.); Scarfe 10306 1st Class Air Mech. D. H. (Cricklewood, N.W.); Thompson 20195 Act. Cpl. A. (Brixworth).

Dorsetshire Regiment, Attd. Royal Flying Corps.—Perrott 9272 E. (Guernsey).

Sept. 18th.—Cade 44582 2nd Class Air Mech. D. (Herne Bay); Charman 59123 2nd Class Air Mech. C. E. (Bexhill); Taggart 23451 1st Class Air Mech. R. (Isle of Man)

Sept. 20th.—Atkins 11893 1st Class Air Mech. F. F. (Harewood Avenue, N.W.); Bown 10530 1st Class Air Mech. S. C. (Swindon); Martin 58164 2nd Class Air Mech J. C. (British Museum, W.C.); Menness 21662 Cpl. W. T. (St. Paul's Cray); Shead 49966 2nd Class Air Mech. J. H. (Hereford).

Missing.

Sept. 17th.—R.F.C.—Hallam 77456 2nd Class Air Mech. C. (Heckmondwike); Hughes 6211 2nd Class Air Mech. T. W. (Llanidloes); Richman 61852 2nd Class Air Mech. W. (Ulverston)

Sept. 18th.—Hurley 22446 1st Class Air Mech. J. V. (Handsworth); Organ 4630 F.Sjt. W. (Shurdington)

Sept. 19th.—Hawkins 46209 2nd Class Air Mech W. (Minehead).

Previously Missing, now Reported by the German Government Died of Wounds.

Sept. 20th.—R.F.C.—Shepherd 1054 Flt.-Sjt. A. G. (Wolverhampton).

PERSONAL NOTICES.

Deaths.

BARLOW.—Sec. Lt. John Lancashire Barlow, R.F.C., who was killed on Sept. 23rd, aged 18, was the second son of Mr. and Mrs. Alexander Barlow, of Wivenhoe Hall, Essex. He was educated at Mr. Brown's School, Eastbourne, and at Shrewsbury School, and joined the 8th Essex Cyclist Battalion on August 4th, 1914, at the age of 15. He served until December, and then trained for the Royal Fying Corps. On reaching the ag eof 18 he was gazetted to a commission in the R.F.C. He had served four months at the front as a scout flyer.

BOYD.—Sec. Lieut. Philip Bentinck Boyd, Gordon Highlanders, attd. R.F.C., who was previously reported missing, now reported killed in action on April 13th, was the husband of Dorothea Boyd and elder son of Mr. and Mrs. Gamble Boyd, Toronto, Canada.

CHOWN.—Sec. Lt. F. J. Chown, R.F.C. (killed in action on Sept. 20th) was 19 years of age, and only son of Dr. and Mrs. Chown, of Townshend, near Hayle, Cornwall. He had his commission in July, 1916, and received his "wings" in May of this year.

CRUICKSHANK.—Sec. Lieut. Kenneth George Cruickshank, R.F.C., reported missing on July 11th last, is now officially reported killed in action on that date, while engaged on an offensive patrol.

He was the only son of Mr. James Cruickshank, of 47, Northwood Road, Forest Hill, and the War Office. He was educated at St. Dunstan's College, Catford, and Finsbury Technical College, and joined the 20th London Regt. on the outbreak of the war. Obtaining a commission on December, 1914, in the Lancashire Fusiliers, he was transferred to the R.F.C. in June, 1916, while serving in Egypt.

He obtained his wings at home in March, 1917, and proceeded abroad on June 6th to join a scout squadron. He was 21 years of age.

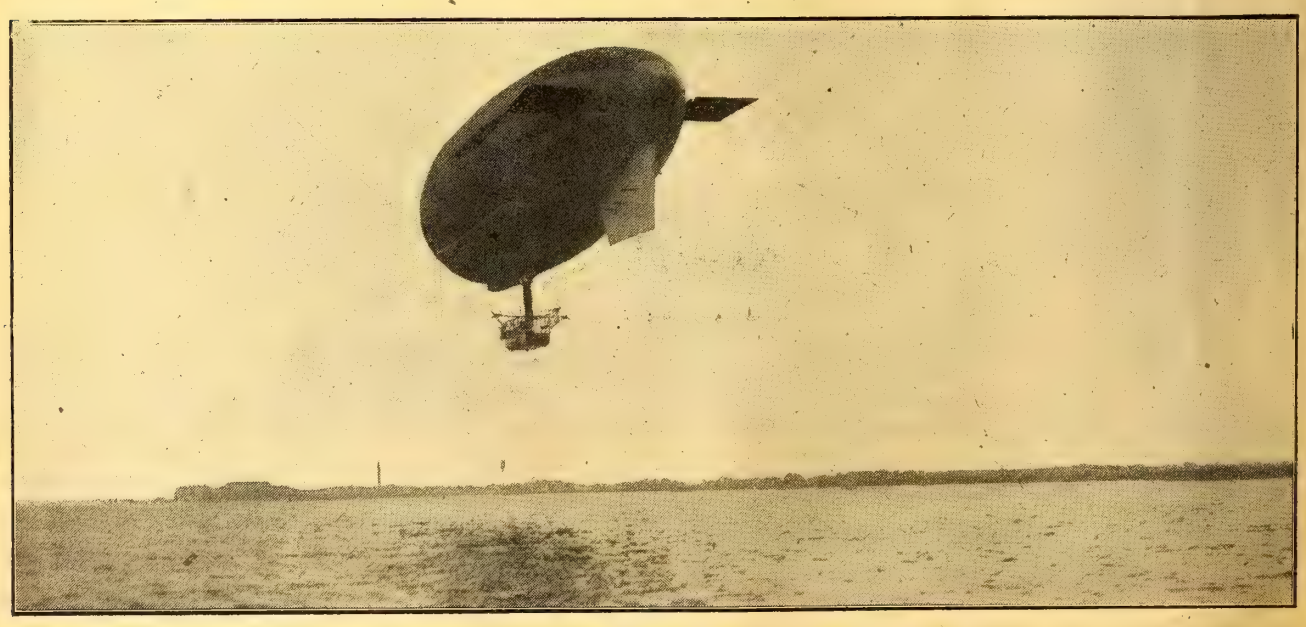
LITCHFIELD.—An inquest was held at South Darenth on Sept. 27th on the body of Lt. Frederick George Litchfield, R.F.C., whose home was at Baring Road, Croydon, and who was killed by the falling of his machine on Sept. 24th. It was stated by a soldier that the machine was flying very low, only about 50 ft. up, and the engine was making a peculiar noise. The machine dropped to about 30 ft., and then suddenly nose-dived into a field. Major Maxwell said the machine was so badly smashed that it was impossible to say what caused the accident. A verdict of death from misadventure was returned.

A statement was published in this column last week that Lieut. H. Nunn, R.F.C., had been killed at Dartford through the aeroplane in which he was flying nose-diving to earth, and that his companion had been injured. The facts are that Mr. Nunn, who was acting as observer, was injured, but not killed, while Lieut. Litchfield, the pilot, lost his life.

McKERGOW.—Lieut. Robert Dudley Wilson McKergow, Dragoon Guards, attd. R.F.C., elder son of Lieut.-Colonel McKergow (Queen's Own) Royal West Kent Regiment, and Mrs. McKergow, of Twineham Grange, Sussex, was killed in action while flying on September 21st. Born in 1898, and educated at Rottingdean School and Uppingham, he entered Sandhurst in May, 1915, and was gazetted to the Dragoon Guards on October 20th, 1915. He joined the R.F.C. as an observer on September 13th, 1916, and served four months in France, returning to England to obtain his pilot's certificate. He returned to the front on August 11th last.

His commanding officer writes:—"Your son was one of the most popular members of this squadron, and had done very gallant work during the short time that he was with us."

MAITLAND.—An inquest was held on Sept. 25th, at Croydon, on Sec. Lieut. Arthur James Maitland, R.F.C., aged eighteen, who was killed on Sept. 22nd, as reported last week. The father said his son was a keen aviator and had been training since May, but had not won his wings. He was never happier than when he was flying. A Captain said that Mr. Maitland was flying a certain machine, which they found to be all right. He went up to a height of three thousand feet and began to do "stunts." He turned several times to the right and to the left, and rolled wing over wing, doing a series of spins and looped



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the loop. Suddenly he came down in a spinning nose dive known as the corkscrew, and witness thought he was "stunting," but unfortunately he misjudged the distance. He fell to earth, and the machine was smashed, with the aviator underneath. A verdict of accidental death was returned.

NOSS.—Sec. Lieut. Arthur Rex Burden Noss, M.C., R.F.C., only child of Mr. and Mrs. A. A. Noss, of 2, Dickenson Road, Crouch Hill, N., has died of wounds. He was educated at Herne Bay, and in his last year there won eight prizes in the athletic sports.

PEGGS and JAMES.—Inquests on the bodies of two air mechanics who lost their lives as the result of an observation balloon breaking away from Roehampton were held on Sept. 25th. Five captive balloons broke away on Sept. 21st. Two mechanics named Peggs and James were caught by the ropes and dragged into the air. James let go and fell after the balloon had travelled a short distance, and Peggs fell at South Norwood.

The flight sergeant said there were five balloons connected together by a cable, and nobody was to go up in them. They were being sent up as an experiment, the cable was fixed to the balloons, and the order was given to haul them down. There were 48 men holding them. "There was a gale," said the witness, "and my balloon was nearest to the wind. Suddenly there was a bang and the cable was broken. I shouted 'Stand clear; leave go, everybody.'" The balloon shot up into the air, dragging Peggs and James with it. They were caught in the rigging and had no chance. Eventually the other balloons broke away. James let go and fell, being killed instantly. The last he saw of Peggs was that he was hanging onto the balloon. The witness had never seen a cable break before.

A second lieutenant of the R.F.C. said the extra strain on the cable was the cause of it snapping. Both men were caught in the rigging. If they had been able to make themselves fast, they would have been saved, because the balloon would automatically deflate. The balloon had drifted eight miles before Peggs fell out.

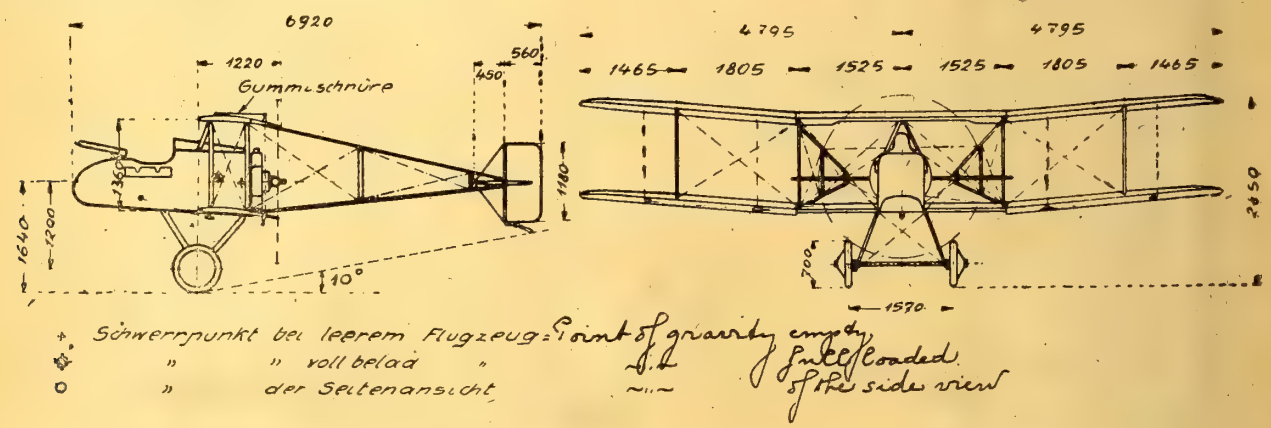
A gardener at Falkland Park said that as the balloon approached him he saw Peggs falling, turning over as he fell. He crashed through the trees, and fell into the shrubbery about 3 ft. away from the witness.

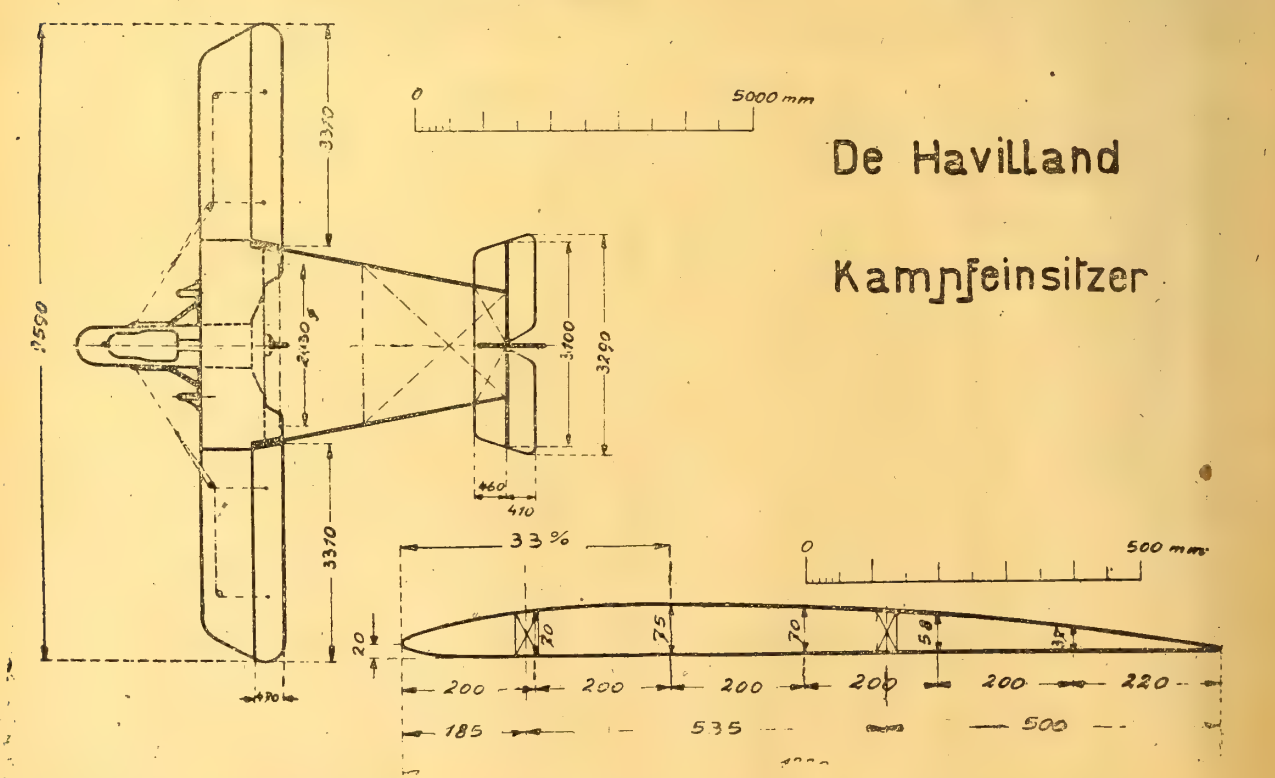
In each case a verdict of "Accidental death" was returned.

TALBOT and MALCOLM.—An inquest was held on Sept. 27th at Southend on the bodies of Sec. Lieut. Arthur Sydney Talbot, R.F.C., aged 28, and Sec. Lieut. Geoffrey Malcolm, R.F.C., aged 26, who were killed as the result of a collision in the air. An officer of the R.F.C., who witnessed the accident, said the officers were flying at a height of some 500 to 800 feet, and as they were descending in spiral fashion a machine in charge of Lieut. Dick came into collision with them. It was thought that in the positions in which the machines were the pilots could not see one another. The machines fell to the ground and were wrecked. The two officers were killed, and Mr. Dick suffered a broken leg. A verdict of "Accidental death" was returned. Mr. Malcolm was taking his first lesson in flying.

WARD.—Major George Bernard Ward, M.C. (Squadron Commander), R.F.C., who was killed on Sept. 21st, was the eldest son of David Ward, Lower Hall, Foxearth, Essex. He was 26 years of age. Memorial service at 3.30 p.m. on Sept. 30th at Foxearth Church.

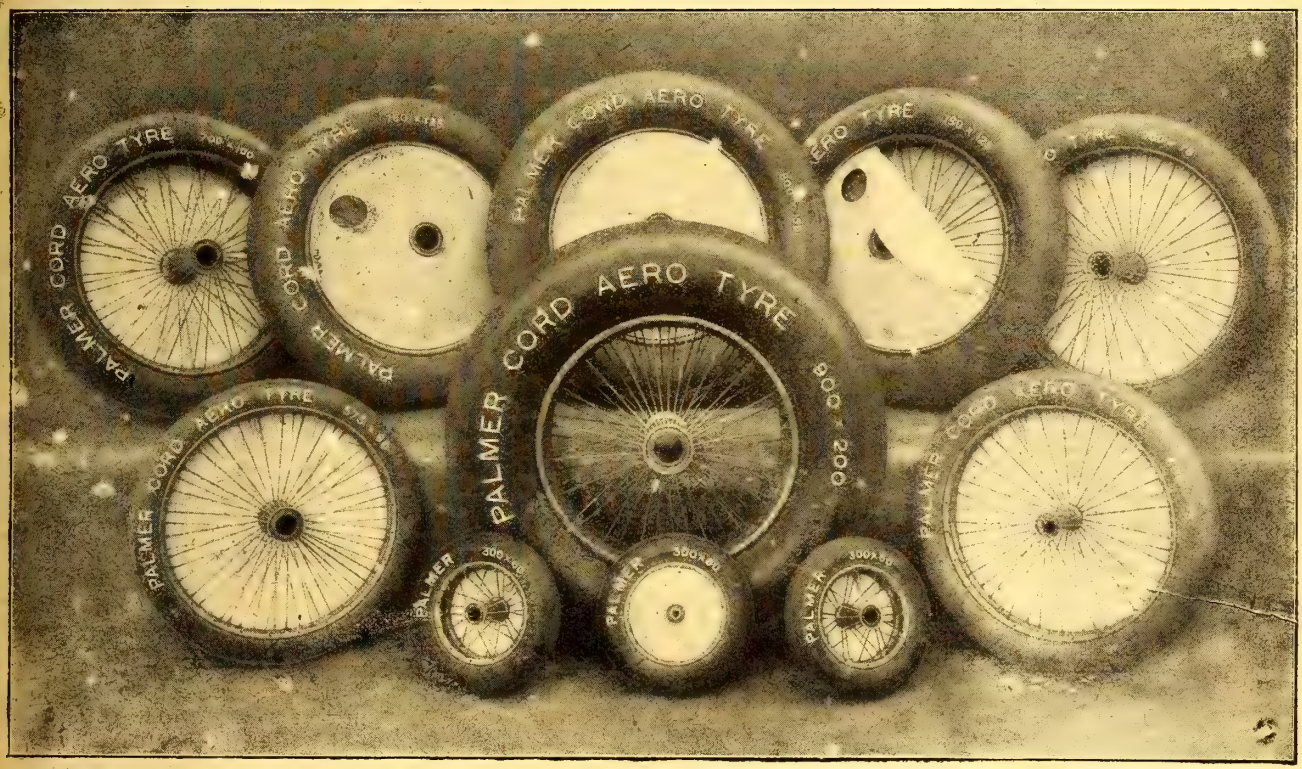
(*Continued on page 986.*)





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450×60	30	89.	31.75	Central
575×60	14	150.	38.09	104/46
,,	21	160.	28.	Central
,,	34	150.	31.75	104/46
650×65	9	178.	44.45	132/46
,,	20	178.	38.09	132/46
,,	75	178.	31.75	132/46
600×75	14	150.	38.09	104/46
,,	21	160.	28.	Central
,,	34	150.	31.75	104/46
700×75	9	178.	44.45	132/46
,,	20	178.	38.09	132/46
700×75	75	178.	31.75	132/46
,,	*80	178.	44.45	132/46
,,	*91	178.	31.75	132/46
,,	*98	178.	44.45	Central
700×100	2	185.	55.	135/50
,,	4	185.	55.	Central
,,	18	178.	44.45	132/46
,,	26	150.	40.	Central
,,	33	150.	38.09	Central
,,	66	178.	38.89	132/46
,,	96	178.	55.	132/46
750×125	2	185.	55.	135/50
,,	4	185.	55.	Central
,,	18	178.	44.45	132/46
750×125	26	150.	40.	Central
,,	33	150.	38.09	Central
,,	66	178.	38.89	132/46
,,	96	178.	55.	132/46
800×150	8	185.	55.	135/50
,,	10	185.	55.	Central
,,	†36	185.	55.	135/50
,,	†40	185.	60.32	135/50
900×200	42	185.	60.32	125/60
,,	47	185.	55.	125/60
1000×150	97	250.	65.4.	Central
1100×200	52	185.	55.	116/69
,,	57	185.	55.	Central

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By W. Bernard Murphy, M.Ae.S.

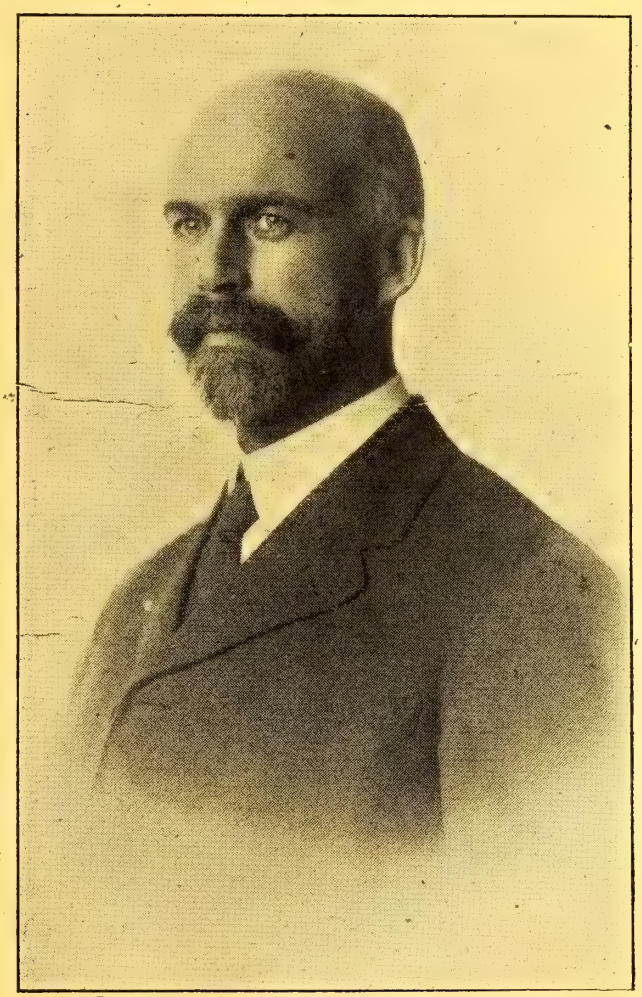
Mr. W. R. Turnbull, M.E., A.F.Ae.S., F.R.Met.Soc., was born on October 16th, 1870, at St. John, N.B., Canada. He received his University training at Cornell University, New York State, U.S.A., where he graduated in 1893 with the degree of mechanical engineer. He then proceeded to Europe and continued his scientific studies at Berlin and Heidelberg in Germany until 1895.

Then he obtained the position of experimental engineer with the General Electric Company, of Harrison, New Jersey, where he remained until 1900. Determining to undertake scientific research work he returned to his home in Canada, and, in 1902, became interested in aviation.

The following year he established a laboratory at Rothesay, New Brunswick, containing a small wind-tunnel, 2 ft. 6 ins. square. With the aid of this he investigated the problems of lift, drag, centre of pressure, etc., of various types of aerofoils.

His first results were published in the "Physical Review," New York, for March, 1907. At this time the only published data on the travel of the centre of pressure was by Joessl. Mr. Turnbull investigated these data and discovered that Joessl's Laws only applied to flat surfaces. He also discovered the principles of the double curvature surface, by which the centre of pressure advances steadily towards the leading edge of an aerofoil as the angle of incidence is decreased.

This question of the double curvative surfaces, involving as it does important considerations concerning the stability of aerofoils, has only recently been investigated by M. Eiffel, the National Physical Laboratory, and others. The results then obtained are incorporated in some of the fastest modern aircraft, and will be even more extensively applied to the heavier aircraft of the near future.



Mr. W. R. Turnbull, M.E., A.F.Ae.S., F.R.Met.Soc.

In 1906 Mr. Turnbull tried to produce a seaplane by first developing a hydroplane, driven from petrol motor by means of an air propeller, and afterwards attaching wings of his own design. He conducted numerous experimental trials with two different forms of hydroplanes during 1906-7. At that time, however, the only engines he could obtain were of such low power and so unsatisfactory in use that he had to abandon his experiments.

Most of 1908 he spent in laboratory research work, but towards the end of the year came to Europe in search of a reliable aero-motor. His search proved fruitless, but while in England he read a paper, entitled "The Efficiency of Aeroplanes, Propellers and Motors," before the Aeronautical Society of Great Britain, for which he was awarded the bronze medal of the Society. This was the first medal ever awarded by the Society.

On his return to Rothesay he commenced an exhaustive investigation into the design of air propellers. In 1910 he discovered the static laws of air propellers, which were published in the "Aeronautical Journal" for October, 1910. These laws have since been confirmed by Riabouchinsky, Eiffel, and many other scientists.

After this he built a special track several hundred feet long so as to be able to investigate more thoroughly the efficiency of airscrews travelling through air. The results obtained from these experiments he published in the "Aeronautical Journal" in January, 1911. Mr. Taylor also acknowledged Mr. Turnbull's pioneer work in this direction in his article for the same journal of a later date.

The following year he was elected an Associate Fellow of the Aeronautical Society of Great Britain and chosen to represent the Society at the first annual meeting of the American Aeronautical Society.

Later on he conducted a long series of experiments to discover the relative efficiency of the many devices proposed for aeronautical locomotion. These consisted of propellers, feathering paddle wheels, flapping wings, vacuum discs, and many others. It was while engaged in these experiments that he obtained the data for his "General Laws of Aerodynamics," published in the "Aeronautical Journal" for January, 1912. It was also at this time that he discovered that "Langley's Law" was only a certain phase of one of the above general laws.

On the outbreak of war he left Canada for England to give his services towards producing fighting aeroplanes. He became associated with one of the firms just starting to manufacture aircraft. Of his war-work it is impossible to give full details, but some outstanding features of it are already well known. His propeller work in par-

ticular has been highly successful. The present altitude record for seaplanes was obtained by aid of one of his propellers, and the propellers of his design have proved on occasion much more efficient than those of other designers, private as well as official.

He has also designed other apparatus to assist the fighting services in such branches of their work as bomb-dropping and prevention of submarine attack.

It is to be hoped that when peace returns he will find time to publish all the valuable data that he has discovered by his years of patient research and experiment. It must also be recorded that, although Mr. Turnbull may be classed among the scientific pioneers of aerodynamics, he did not obtain all his data within the ease and comfort of his laboratory. The plant for his early experiments had all to be devised and built by himself, and much of his knowledge was only obtained by travelling extensively between the aviation centres of Europe and America.

Not content with this, whenever any data are required which necessitate actual flying, he is always ready to go up in new and experimental machines to see for himself the results of his calculations. In spite of his mature age he recently went to a height of over 13,000 feet to watch the performance of one of his propellers. The propeller in question, as a matter of fact, beat one of official design by 100 per cent. in the rate of climb.

Those, however, who have the pleasure of meeting Mr. Turnbull on the tennis court, soon realise that age has dealt lightly with him. In fact, his opponents have been heard to declare that many of his strokes must have been originated in the laboratory with the aid of slide-rules and the other satanic devices of scientists.

The Production of Aeroplanes and their Components

(Fifteenth Instalment).

BY STEPNEY BLAKENEY.

Testing and Stretching Cables.

The necessary material for the cable testing and stretching apparatus consists of two sound pieces of deal or pitch-pine, 16 ft. long, 9 in. by 2 in. These will have to be planed all over, after which two pieces of 9 in. by 9 in. by 3 in. will be sandwiched between the two ends of these long pieces of timber so as to keep them 3 in. apart, on edge. When fastened to the legs they will stand on, they should be about 3 ft. 6 in. above floor level.

These 9 in. by 9 in. by 3 in. packing or distance pieces will be securely glued and bolted in their permanent position. After this, ¾-in. holes must be drilled through the centre of each piece of timber on each side-face, exactly opposite each other, about 9-in. centres, to allow of the tension-head of the apparatus being moved, and the length of the apparatus being adjusted to suit different lengths of cable.

The Tension-head.

Having completed the apparatus so far, the next thing to do will be to construct the tension-head. This can consist of a piece of sound, well-seasoned ash, about 1 ft. 6 in. long, by 9 in. by 3 in. This will have a ¾-in. hole drilled through the 3 in. thickness of the piece, in the centre, and 4½ in. from one end, so that the ¾-in. bolt, which passes through the side of the 16-ft. timbers, can pass through this piece also and hold it in position. On the sides of this short piece of ash two chocks, each 9 in. long by 3½ in. by 2 in., will be glued and bolted. And further, through the edge of this piece of ash, which is 3 in. thick, will be drilled a ¾-in. hole. This is for the ¾-in. tension-bolt to pass through, to which the cable which has to be stretched is attached.

At the other end of the 16-ft. timbers will be fixed a 10 to 1 bell crank-lever, or combination of levers. The short end will project upwards between the two 9 in. by 2 in. timbers, and to this will be fixed a suitable swivel link to which to attach the cables.

At the long end of the lever arrangements and fittings will be made for attaching a spring balance, capable of reading up to a load of at least 300 lbs. This will be used for the purpose of indicating the amount of strain to which the cable is being strained. (See Fig. 20.)

The many uses for testing purposes to which this machine can be put, and the valuable data obtained thereby, quickly repay its cost. The use of one of these machines is badly needed in most works using cables and ropes. It is easily made, and cannot get out of order. Also, accurate readings can be obtained by any intelligent person.

Castle Nuts.

Regarding the use of nuts, it frequently happens that "castellated" nuts have to be used, and, assuming that supplies have run out, which occasionally happens, it may cause considerable delay in waiting for further supplies from the actual manufacturers. Therefore, having described in the Tenth Instalment of this article the method generally adopted for making small bolts, it may be as well to add in this Instalment a method frequently adopted for cutting the slots of castellated nuts.

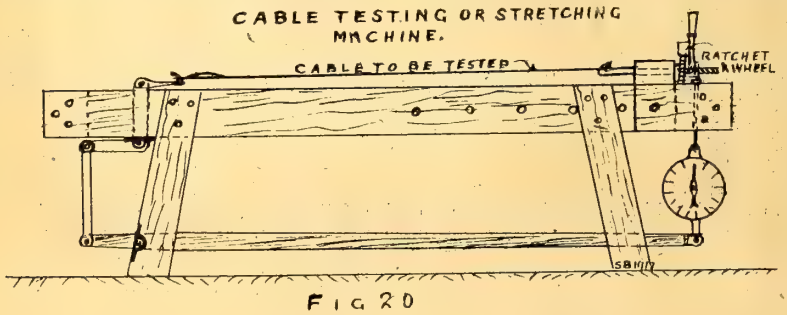


Fig 20

A small or large plain milling machine will be utilised for this purpose.

To the table of the machine attach a machine-vice, and in between the jaws lay a rectangular bar of mild steel which has been "shaped" all over. The length of the bar being not less than the length of the jaws, the size of this bar will depend on the size of the nuts to be castellated.

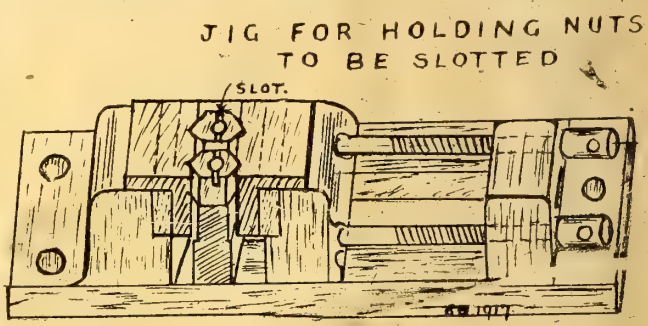


Fig 21

This bar of steel may be a few hundredths of an inch less in width than the width across the corners of the nuts (see Fig. 21). This is for the nuts to rest on, to keep them up to the slitting-saw.

For the purpose of holding, say, half a dozen nuts in between the machine-vice jaws, in their correct position for slotting, we must prepare two pieces of angle steel with vertical Vee slots cut in each of them. These Vee slots are for the purpose of gripping the corners of the nuts firmly, whilst they are being castellated.

Owing to these Vee slots being required in the angle steel pieces, it will necessitate them being made out of the solid bar, the angle for laying on the machine-vice jaws being either milled, planed, or shaped out. As these two pieces of angle steel will be subject to considerable work, it will be as well to make them at least ½ in. thick all over, and case-harden them.

The Use of the Jig.

Having made the above jig for castellating the nuts, all that has to be done is to fill up the new angle jaws with as many nuts as they have Vee slots in them and carefully see that each nut beds down equally on the packing-up strips under them. Tighten up the jaws firmly, fix the slitting-saw in the mandril, and adjust the height of the milling machine table, and thereby regulate the depth of the slitting-saw cut in the nuts. Start the machine and the cross-feed and lubricate the saw with the cutting compound.

By this means half a dozen nuts can be quickly slotted across two flats, of each of them. As soon as this operation and cut is finished, stop the milling machine, unscrew the machine-vice slightly, turn each nut round, and slot twice more, and the six nuts are done. By this means nuts are slotted or castelled quickly, cheaply, and accurately.

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Hinge Bolts.

The milling of small hinge bolts is a subject which may be useful to consider, also the drilling of the pin-hole.

The small hinge bolts having been turned out from the capstan lathes, and being made out of round bar, will at this stage of manufacture only have cylindrical heads, therefore, it is necessary to prepare a jig to hold them in whilst the heads are squared on the sides and the tops formed to a radius.

Making a Bolt Jig.

The jig may be formed in the following manner :—

The pattern-maker will be instructed to make a plain, rectangular pattern with the ends flanged for bolting down onto the table of the milling machine. The length will be about 10 in., the width 4 in., and the thickness about 3½ in. (see Fig. 22).

Plane up the top and bottom surface of the castings, which will be cast-iron. Then mark out the longitudinal centre line

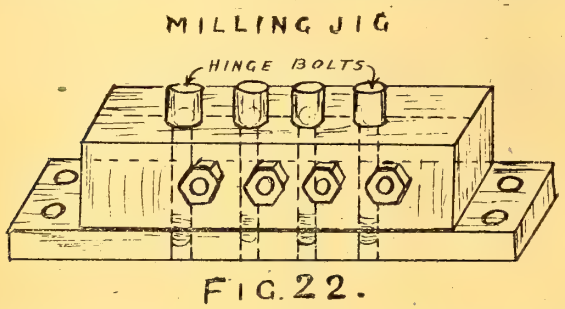


FIG. 22.

of the casting on the top side. On this line space out, at about 1-in. centres, the holes into which will be placed the hinge bolts to be milled. Drill these holes right through the casting to the bottom.

The next thing to do is to provide some means of fixing the bolts to be milled, therefore, a hole must be drilled through the centre of the side of the casting, at right-angles to the existing holes, at each one, in such a position that the circle of the fresh

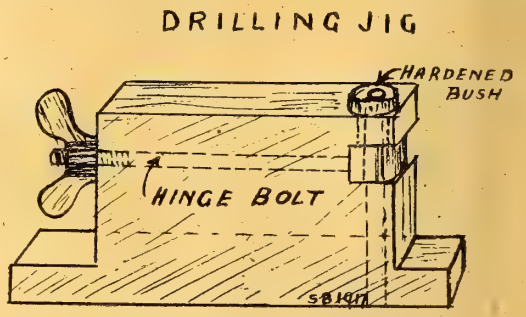


FIG 23

hole cuts the existing hole by about one-third of its diameter. Into these holes will be fitted plain bolts, with nearly one-third of their side filed off, so as to form a taper wedge against the bolt which is in the vertical hole to be milled. To prevent the wedge bolt from turning round and causing trouble when other bolts are required to be inserted for milling, a feather is fitted to the wedge bolt and a slot is filed in this bolt hole to take it.

Method of Use.

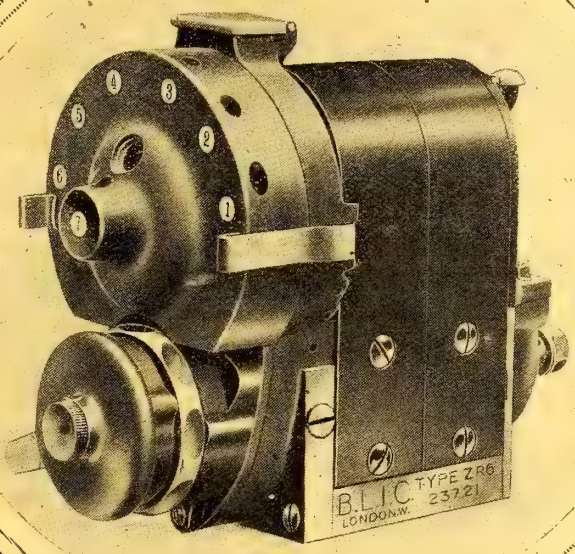
Having completed this jig, the method of working it will be to take, say, six bolts and drop them in the vertical holes, making sure that they are right home. Then firmly tighten up the nut at the end of each wedge bolt, thus locking all the bolts to be milled in position. Fix the jig on the table of the milling machine with bolts, and then fix the milling cutters. Adjust height of the table and proceed with the work.

Having completed the milling of the heads of the hinge bolts, the next thing is the drilling of the pin-hole in them, and for this purpose a small drilling jig can easily be made (see Fig. 23).

(To be continued.)



IN THE HANDS OF THE ENEMY.—A Sopwith Triplane, evidently partly burnt, captured by the Germans. A detailed description, from the German point of view, is published on page 960.



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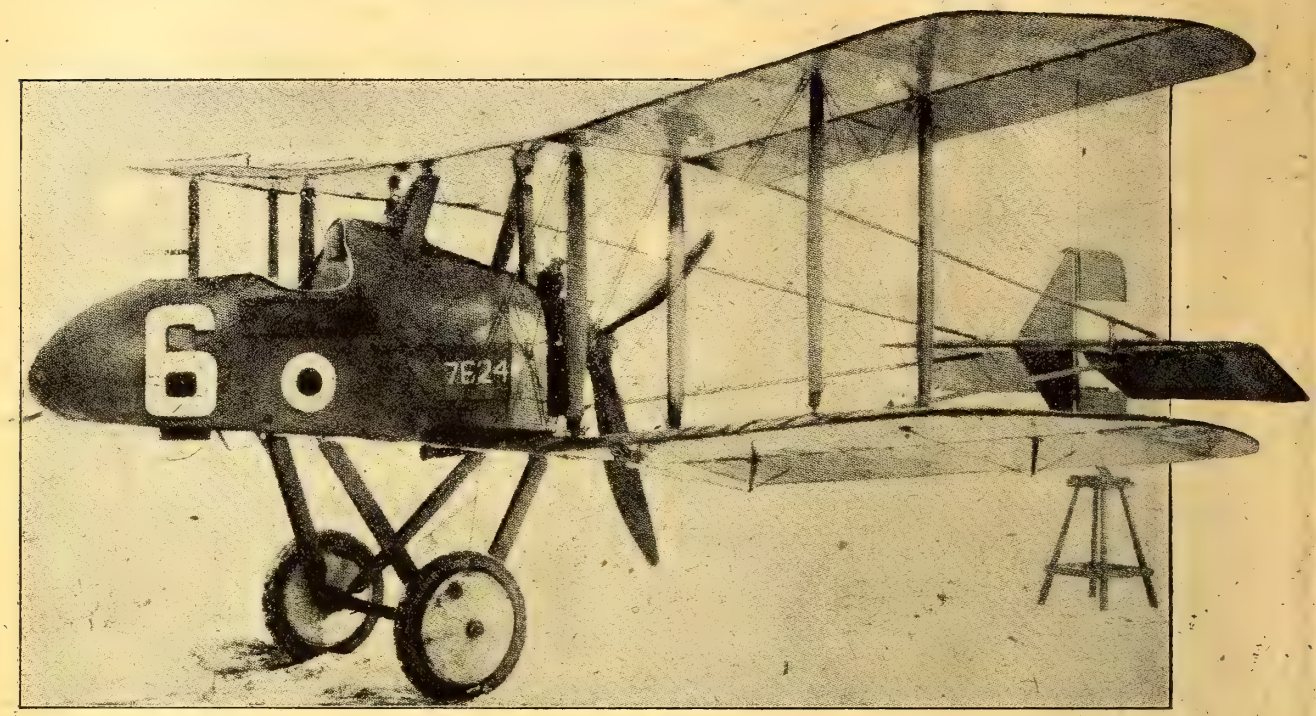
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IN THE ENEMY'S EYES.



A well-known British "Pusher" Scout, called by the Germans a de Havilland.

THE DE HAVILLAND FIGHTING SINGLE-SEATER (SO-CALLED).

The following particulars were published in "Flugsport," the leading German aeronautical paper, concerning one of our single-seat fighting pusher biplanes, which is apparently known to the Germans as a de Havilland. The mistake is, perhaps, excusable, and it could not matter very much if one told them wherein the mistake lies. Nevertheless, it might be a pity to destroy their cherished illusions. In any case, both machines are out of date in these days, having been put into use early in 1916. It seems well, however, to publish the illustrations and the description, which is given as transiated literally by a neutral correspondent :—

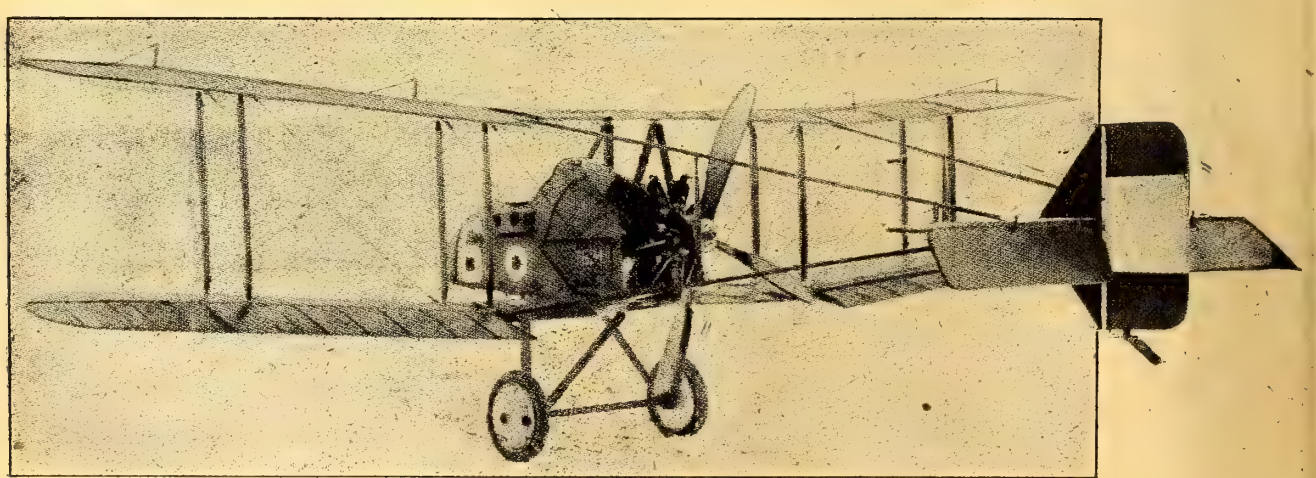
"For the British designers it was difficult with the available means for even experts to produce a machine equal to the German ones, and the case was of producing a single-seated fighting aircraft. The main demands were: Maximum speed, control, climb and forward firing abilities. As the English aeroplane science was much behind, especially in the field of firing through the propeller, the producing of a tractor single-seater had thus to be excluded. Forced by need, the design resulted thus in a pusher type with tail-booms, being the small de Havilland scout, which was ordered in large quantities by the British armies.

"It is well known that this type was hurried to the British front early in 1916, where some whole squadrons were destroyed by accident. [Evidently a reference to the report of the announcement in Parliament of a squadron manned by new pilots being destroyed in a storm.—Ed.]

"As evident from the accompanying illustrations the de Havilland scout consists of a centre section of a span of 3.5 metres, to which the V-shaped tail-booms are fixed. The planes have two sets of struts. The boom tail, carrying the rudder and elevator, is led to the rear struts of the centre set. Mutually connected ailerons of a span of 3.31 metres are arranged at the ends of both planes. The ailerons are kept in the wing-curve direction by rubber cord, fixed on the top of the upper planes.

"A 100 h.p. Gnome monosoupape is the power plant, driving a four-bladed propeller of a diameter of 2.34 metres. The fuel tanks are placed in front of the motor behind the pilot's seat with a pivoted turnable gun in front. The empty load of the aeroplane amounts to 476 kilos, the load being 722 kilos when equipped with fuel for 2½ hours' run and with pilot and gun. The specific charge is thus 35.6 kilos per square metre.

"In spite of the resistance of the pusher type this aeroplane should at an estimation attain a speed of 150 kilometres per hour. It flies easy and is very soft on control."



Three-quarter back view of the British "Pusher" Scout.

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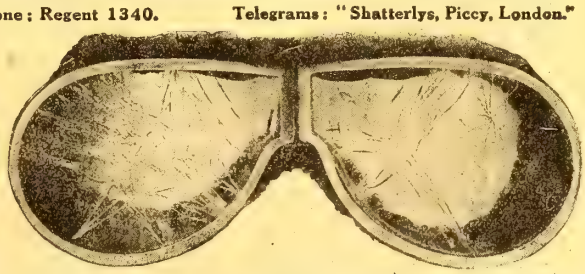
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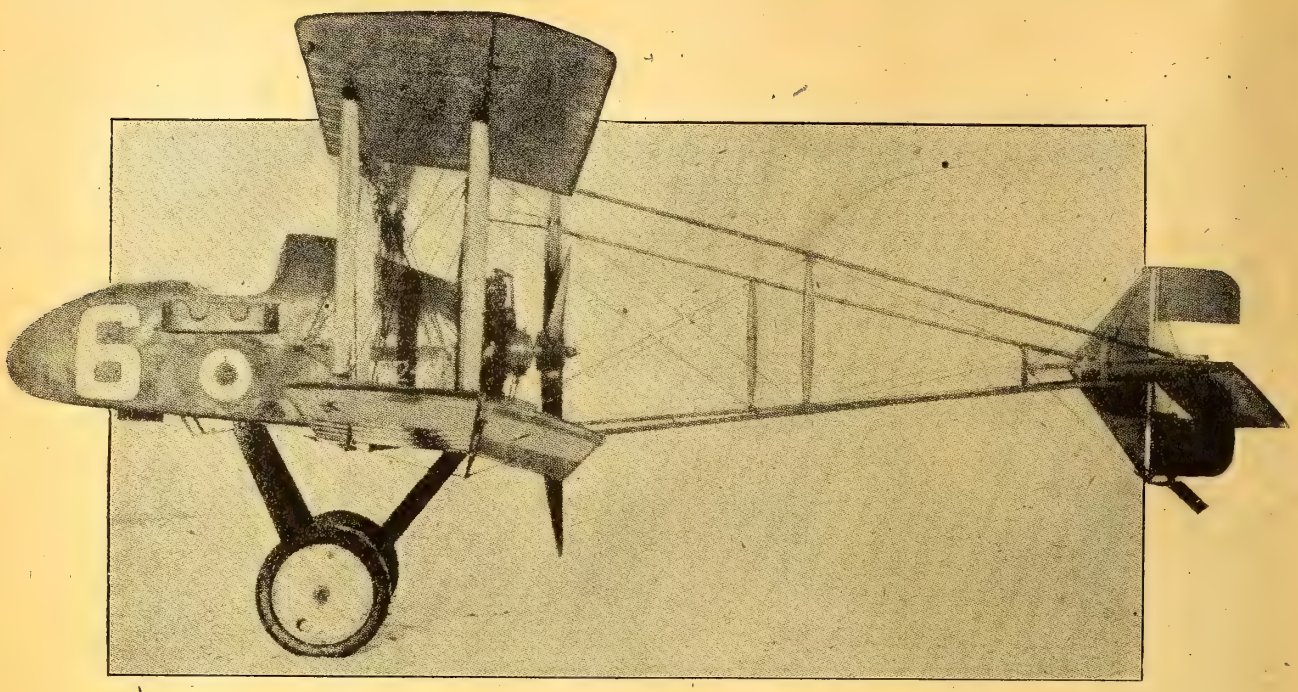
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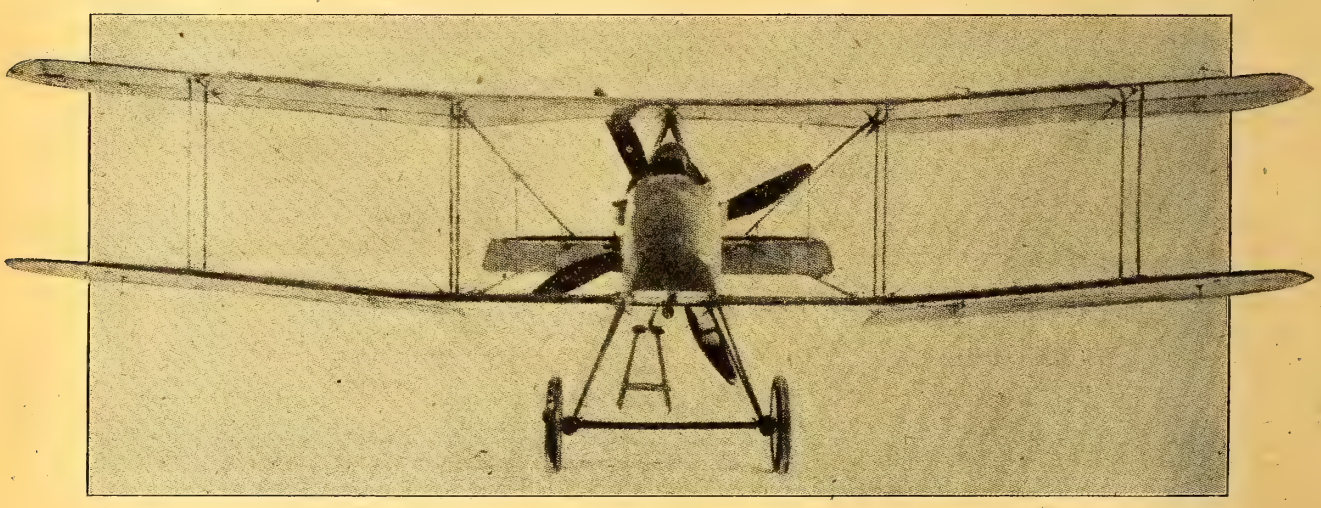
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The above is an actual photograph of the Goggles referred to in the accompanying letter.



Direct Side View of the So-called de Havilland Scout.



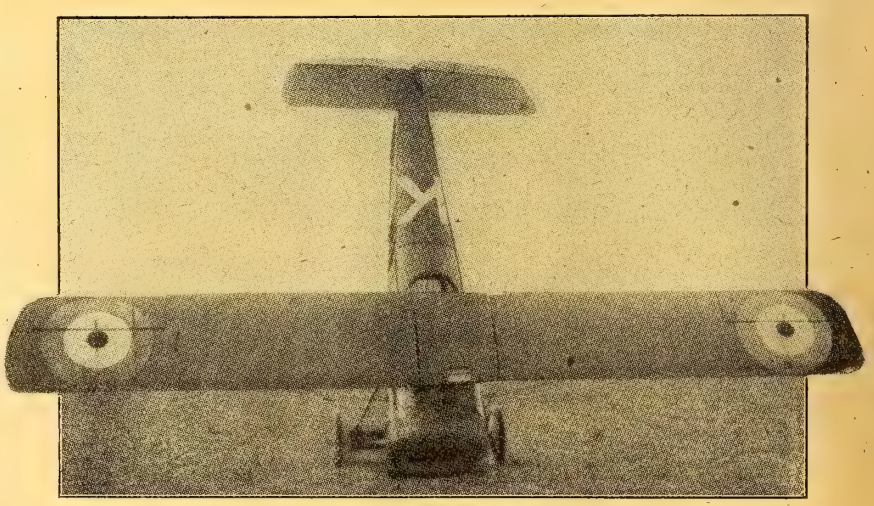
Direct Front View of the So-called de Havilland Scout. This Photograph and those accompanying it are reproduced from the German technical journal "Flugsport."

THE SOPWITH TRIPLANE.

In the August issue of "The German Airmen Journal" the well-known writer of aerial matters, Engineer Roland Eisenlohr, writes of the Sopwith triplane to this effect.

"Among the new aeroplanes that the war has created the Sopwith triplane holds a special position, being the first triplane to be employed on practical purposes. This type was out of date since the little successful experiments in the early years of aviation by Hans Grade in Germany during 1917, by A. V. Roe in England, and by Goupy in France, and one prophesied the type no big future. Since the American Curtiss aircraft works had at the end of last year for the first time again turned out a triplane, Sopwith has likely felt himself incited to produce too a triplane.

"The cause of falling back on this type may be foremost the small span which is made possible thereby. Perhaps Curtiss had from the start proceeded in the right design of the triplane type,



Plan View of a Sopwith Triplane.

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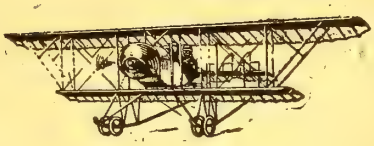
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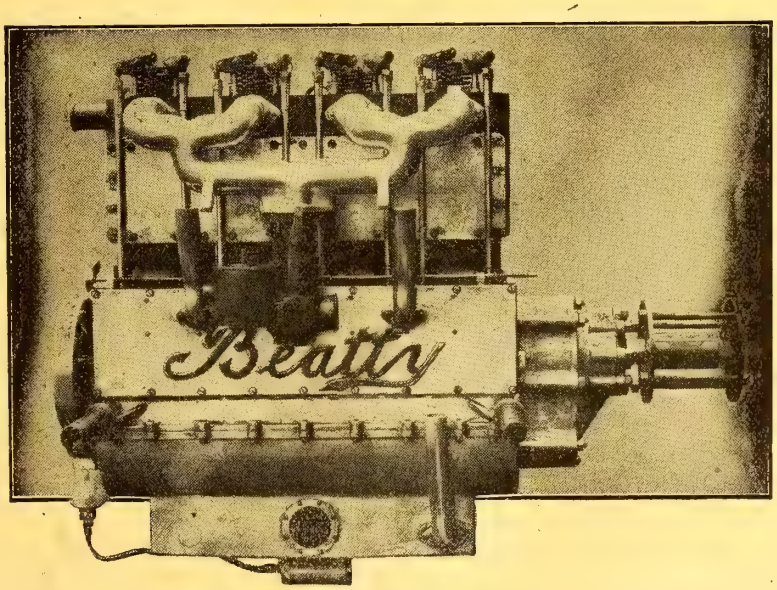
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Standard Aircraft Manufacturing Co., Effingham House, Arundel Street, W.C.2. "Gunsignrush, Estrand, London." City 89.

Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickerfyta, Knights, London." Kensington 6810.

Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000.

Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

White, J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes." Cowes 3.

Airships—

Airships, Ltd., High Street, Merton. Wimbledon 1314.

Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, 'Phone, London." Regent 378.

Aluminium Castings—

Coan, R. W., 219, Goswell Road, London, E.C.1 "Krankases, Isling, London." City 3846.

Aluminium Presswork (Stampings, Etc.)—

Willans & Robinson, Ltd., Victoria Works, Rugby. "Willans, Rugby." Rugby 112 (3 lines).

Bearings (Etonia Cast Phosphor Bronze)—

Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3927.

Brass Sheets for Tipping Propellers—

Lucraft, H., & Co., 147, Fenchurch Street, London, E.C.3. "Lucraftia, London." Avenue 2217.

Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 995, 996, and 7006.

Buildings—

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.

Fairby Construction Co., Ltd., 117, Victoria Street, S.W.1. "Bizfibild, London." Victoria 8868.

Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313

Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

The Wiltley Co., Ltd., Salisbury House, London Wall, E.C.2. "Wrathless, Phone, London." City 2681-2

Cable Coverings and Cable Controls—

Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Capstan Work—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Carburettors—

Hobson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.

Castings—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Lucraft, H., & Co., 147, Fenchurch Street, London, E.C.3. "Lucraftia, London." Avenue 2217.

Castings (Aluminium, Brass, Bronze, Machined or Rough)—

Coan, R. W., 219, Goswell Road, London, E.C.1. "Krankases, Isling, London." City 3846.

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Willans & Robinson, Ltd., Victoria Works, Rugby. "Willans, Rugby." Rugby 112 (3 lines).

Cellon—

Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawb, London." London Wall 5359-3622.

Celluloid (Non-Flam.)—

Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7.

London Label Co., Beckton Road, E.16. "Lonlabel, Canning, London." East 1300.

Clothing—

Burberry's, Ltd., Haymarket, S.W.1. Regent 2165.

Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6.

Hazel & Co., 4, Princes Street, Hanover Square, W.1. Mayfair 4071-2.

Robinson & Cleaver, Ltd., Regent Street, London, W.1. Gerrard 1070.

Component Parts—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (4 lines).

B. D. W. Aircraft Spares, Syon Chambers, 16a, Kew Road, Richmond, Surrey. "Aeros, Richmond." Richmond 1681.

Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6. Hampstead, 4728.

The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aercracons, Canning, London." East 1300.

The Osborne Aircraft Co., Ltd., Whin Hill, Greenock, Scotland. "Cordage, Greenock." Greenock 618.

Cords, Tapes, and Threads—

MacLennan, J., & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.

Dopes—

British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312.

British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellutate, London." Regent 4046.

Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawb, London." London Wall 5359-3622.

Clark, Robert, Ingham & Co., Ltd., Caxton House, S.W.1. "Pearline, Vic, London." Victoria 2923.

Electrical Accessories—

Mann, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston Road, London." Museum 70.

Premier Electric Heaters, Ltd., 258, 259, and 360, Bradford Street, Birmingham. "Fahrenheit, Birmingham." Midland 081.

The Edison Swan Electric Co., Ltd., Ponder's End, Middlesex. "Ediswan, Enfield." Enfield 520 (6 lines).

Electric Cables—

E. Kalker & Co., Coventry. "Kalker, Coventry." Coventry 24x.

Engines and Parts—

Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford. "Pump, Bedford." Bedford No.

Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-28

The Beatty School of Flying, Ltd., The Broadway, Cricklewood, N.W.2. Hampstead 300

Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London. Gerrard 23

Dudbridge Iron Works, Ltd. (Salmson), 8 Victoria Street, London S.W.1. "Aerflight, Vic, London." Vic 702

Gordon Watney & Co., Ltd., Weybridg "Mercédès, Weybridge." Weybridge 550 (7 line

Green Engine Co., Ltd., Twickenham. Richmond 120

Gwynnes, Ltd., Hammersmith Iron Work Hammersmith, W. "Gwynne, Hammersmith." Hammersmith 191

Rolls-Royce, Ltd., 14 and 15, Conduit St., W. "Rolhead, London." Gerrard 1654-5-

The Selsdon Aero & Engineering Co., Ltd Imperial House, Kingsway, W.C.2. Regent 118

Sturtevant, B. F., Co., Ltd., Hyde Park, Bosto U.S.A.

Sunbeam Motor Car Co., Ltd., Wolverhampto "Moorfield, Wolverhampton." Wolverhampton 98

The Gnôme & Le Rhône Engine Co., Ltd 47, Victoria Street, S.W. "Elevenfol London." Walthamstow 408 (2 line

Willans & Robinson, Ltd., Victoria Work Rugby. "Willans, Rugby." Rugby 112 (3 line

Flexible Shafts—

Herbert Terry & Sons, Ltd., Redditc "Springs, Redditch." Redditch 6

Flying Schools—

Bournemouth Aviation Co., Ltd., Talbot V lage, Bournemouth. "Etches, Winton." Bournemouth 116

Cambridge School of Flying & Aerodrome Co Ltd., 30b, St. Andrews Street, Cambridg

Furniture (Office)—

Cookes (Finsbury), Ltd., Finsbury Paveme House, London, E.C.2. London Wall 573 and 617

Galvanising—

Boulton & Paul, Ltd., Rose Lane Work Norwich. "Aviation, Norwich." Norwich 8

Cowper-Coles Manufacturing Co., Sunbury-o Thames. Sunbury 3

Gears—

Moss Gear Co., Ltd., Thomas Street, Asto Birmingham. "Mosgear, Birmingham." East 40

Glue—

Improved Liquid Glues Co., Ltd., Gt. Hermitage Street, E. (Croid.). "Excroide Wapp, London." Avenue 317

Mendine Co., 8, Arthur Street, E.C. Bank 587

Goggles—

Triplex Safety Glass Co., Ltd., 1, Albemar Street, Piccadilly, W.1. "Shatterlys, Picc London." Regent 134

Heating and Ventilating—

Comyn, Ching & Co., Ltd, Castle Street, Lor Acre, W.C. "Comyn, Ching, Westcen London." Gerard 1077 (3 lines

Chas. P. Kinnell & Co., Ltd., 65 & 6 Southwark Street, London, S.E.1. "Kinne London." Hop 372 (2 lines

Instruments—

British Wright Co., Ltd., 33, Chancery Lan W.C.2. Holborn 130

Instruments (Scientific, Alt meters, etc.)—

Short & Mason, Ltd., Macdonald Roa Walthamstow, E.17. "Aneroid, Phon London." Walthamstow 18

Machine Tools—

Brewster & Co., 11, Queen Victoria Stree E.C.4. "Circumfuse, Cannon, London." City 76

Magneto Driving Pieces—

Herbert Terry & Sons, Ltd., Redditc "Springs, Redditch." Redditch 6

Magnetos—

The M-L Magneto Syndicate, Ltd., Victor Works, Coventry. "Corlton, Coventry." Coventry 1008-100

The British Lighting & Ignition Co., Ltd 204, Tottenham Court Road, W.1. "Vickmag, Phone, London." Museum 43

Metal Manufacturers—

Clifford, Chas., & Sons, Ltd., Birminghar "Clifford, Birmingham." Central 42-4

Metals in General—

Samuel Mercer & Co., 198, Upper Thame Street, E.C.4. "Reconciled Cannon, London." City 634

Pritt & Co., 46, Fenchurch Street, Londo E.C.3. "Poetry, Fen, London." Avenue 995, 996, and 700

BUYERS' GUIDE.

al Parts and Fittings—

cles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
craft Supplies Co., Ltd., 17, John Street, Theobald's Road, W.C. "Upcast, Holb, London." Holborn 858.
nott & Harrison, Ltd., Hythe Road, Willesden Junction. Willesden 2297.
yliss, Jones & Bayliss, Ltd., Wolverhampton. (Bolts and Nuts.) "Bayliss, Wolverhampton." Wolverhampton 1041.
e Birmingham Guild, Ltd., 45, Gt. Charles Street, Birmingham. "Handicraft." Central 3705.
ckburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk, Bham." Central 550.
e British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow, London. "Golshel, Hounslow." Hounslow 254.
nn, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston road, London." Museum 70.
untford, Fredk., Ltd., Fremo Works, Lifford, Birmingham "Fremo, Birmingham." Kings Norton 261.
bery, Owen, & Co., Ltd., Darlaston. "Roofs, Darlaston." Darlaston 87.
ikey, Joseph, & Sons, Ltd., Wellington, Shropshire. "Sankey, Wellington, Salop." Wellington 66.
e Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.
e Aircraft Construction Co., Harlev Works, Beckton Road, E.16. "Aercracons, Canning, London" East 1300.
ompson Bros., Ltd., Bradley, Bilston. "Thompson Bros, Bilston." Bilston 10.
oler Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10.

al Shearing Tools—

ntgomery, Smith, & Co., Ltd., Tangent Works, Keynsham, near Bristol. "Ingenuity, Saltford." Keynsham 21.

al Spinnings—

briel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham."

ric Bolts—

Central 1223.
shmore Bros., Zota Works, Hildreth Street, Balham, S.W. Battersea 415.
bery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

cellaneous—

derson, D., & Son, Ltd. (Roofs), Belfast. "Anderson, Belfast." Belfast 4033-4034-4035.
ti-Glare Glass Co., Ltd., 76, Turnmill Street, E.C. Central 3731.
wden Wire, Ltd., Willesden Junction, "Bowirelim, Harles, London." Willesden 2400 (3 lines).
own Bros., Ltd., Great Eastern Street, E.C.1. "Imbrowned, Bethroad, London." London Wall 6300.
ison Swan Electric Co., Ponder's End. (Lamps.) "Ediswan, Enfield." Enfield 520 (6 lines).
dolithic Manufacturing Co., Ltd., 61½, Fore Street, London, E.C.2. Labels in Metal, Ivory, Ivorine, etc.
rbert Frood Co., Ltd., Chapel-en-le-Frith. "Frodobrake, Birmingham." Central 793.
asso Manufacturing Co., Ltd., 211, City Road, E.C. City 9558.
ndon Label Co., Ltd., Harley Works, Beckton Road, E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.
acLennan, J., & Co., 30, Newgate Street, E.C.1., and at Glasgow. Tapes, Cords and Threads. City 3115.

or Cars—

rol Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.
ann, Egerton & Co., Ltd., 379/381, Euston Road, London, N.W.1. "Manegecar, Euston road, London." Museum 70.
andard Motor Car Co., Coventry. "Flywheel, Coventry." Coventry 530 (4 lines).

neplates and Labels—

dolithic Manufacturing Co., Ltd., 61½, Fore Street, London, E.C.2.
e Clegg Metal Engraving Co., Chatsworth Works, Worthing. "Clegg Worthing."

servation Panels—

riplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

ent Agents—

ing's Patent Agency, 165, Queen Victoria Street, E.C.4. Central 682.
age & Rowlingson, 27, Chancery Lane, E.C.4. Central 332.
anley Popplewell & Co., 38, Chancery Lane, W.C.2. Central 1763.

rol Storage (Bulk)—

ywater & Co. (The Hydraulic System), Craven House, Kingsway, London, W.C.2. "Bywaterist, London." Gerrard 2220.

Piston Rings—

British Chuck & Piston Ring Co., Coventry. "Rings, Coventry." Coventry 723.

Power Presses and Dies—

Bliss, E. W., & Co., 2a, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon, London." Hop 4340.

Presswork—

Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.
Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.
Integral Propeller Co., Ltd. "Aviprop, Hyde, London." Hendon 9. Kingsbury 104.
Lang Propeller, Ltd., Weybridge. "Aerosticks, Weybridge." Weybridge 520-521.
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich" Norwich 482 (4 lines).
Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 291, Leeds.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

Rigging for Aircraft—

Cradock, G., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466.

"Royal Ediswan Half-Watt Type Lamps"—

The Edison Swan Electric Co., Ltd., Ponder's End, Middlesex. "Ediswan, Enfield." Enfield 520 (6 lines).

Safety Belts—

Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.

Sand and Die Castings—

Coan, R. W., 219, Goswell Road, London, E.C. "Krankases, Isling, London." City 3846.

Scientific Instruments—

The Foster Instrument Co., Letchworth, Herts. "Instrument, Leeds." Chapeltown 474.

Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay, 345 (3 lines).
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.
Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton." Southampton 1337.

Seats for Aeroplanes—

Bowser, E., Art Cane Works, 50 Park Lane, Leeds. Central 3437.

Shackles—

The British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow. "Golshel, Hounslow." Hounslow 254.

Sheet Metal Pressings—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 497 Birmingham.
Nicholls & Lewis, Ltd., 16, Princep Street, Birmingham. "Colpressed, Birmingham." Central 7188.
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

Sheet Metal Work—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.

Shock Absorbers (Elastic Cord)—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.

Sparking Plugs—

Forward Motor Co., Sumner Row, Birmingham. Central 6259.
Hobson Manufacturing Co., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.
Lodge Sparking Plug Co., Ltd., Rugby. "Igniter, Rugby." Rugby 235.
Ripault, Leo, & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758.

Springs—

Dart Spring Co., West Bromwich. "Dart. West Bromwich." West Bromwich 322.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Steel—

Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237.
Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham." Smithwick 224.

Steel Tension Wires—

Cradock, G., & Co., Ltd., Wakefield. "Cradock, Wakefield." Wakefield 466 (3 lines).

Steel Tubes for Aeroplanes—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Taper Pins—

Mountford, Fredk. (Birmingham), Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262.

Tapes and Smallwares—

MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow City 3115.
James North Hardy & Son, Ltd., 54, Portland Street, Manchester. "Hardson, Manchester." Central 6471.

Timber—

Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Entikosil, Vic, London." Victoria 5073, 4210.
Brown, R. F., & F. W., Wollaton Saw Mills, near Nottingham. "Brown's Saw Mills, Wollaton." Nottingham 1526.
J. Owen & Sons, Ltd., 199a, Borough High Street, S.E.1. "Bucheron, London." Hop 3811 (2 lines).

Time Recorders—

Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310.

Turnbuckles—

Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

Tyres and Wheels—

The Beldam Tyre Co., Ltd., Brentford, Middlesex. "Beldam Tyres, Brentford." Ealing 125-126.
The Palmer Tyre, Ltd., Shaftesbury Avenue. "Tyricord, Weskent." Gerrard 1214 (4 lines).

Varnishes—

Clark, R. Ingham, & Co., Caxton House, S.W.1. "Pearline, Vic, London." Victoria 2923.
Harland, W., & Son, Merton, London, S.W.19. "Harland, Wimbledon 45." Wimbledon 45 and 1395.
Naylor Bros., Ltd., Southall, Middlesex. "Naylor, Southall." Southall 30.

Washers—

Herbert Terry & Sons, Ltd. Redditch. "Springs, Redditch." Redditch 61.

Watchmakers and Jewellers (Silver Models)—

Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 9091 (3 lines).

Welding Repairs—

Barimar, Ltd., 10, Poland Street, W.1. "Barimar, Reg, London." Gerrard 8173.

Wind Shields—

Auster, Ltd., 133, Long Acre, W.C. "Winflector, London." Regent 5910.
London Label Co., Ltd., Hadley Works, Beckton Road, E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Wires and Cables (Aeroplanes)—

Bruntons, Musselburgh, Scotland. "Wiremill, Musselburgh." Musselburgh 28.
Cradock, Geo., & Co., Ltd., Wakefield. "Cradock, Wakefield." Wakefield 466 (3 lines).

Wirework—

Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Woodworking Machinery—

Robinson, Thomas, & Son, Ltd., Railway Works, Rochdale. "Robinson, Rochdale." Rochdale 467.
Sagar, J., & Co., Ltd., Halifax. "Sawtooth, Halifax." Halifax 136.
Wadkin & Co., Leicester. "Woodworker, Leicester." Leicester 2614.

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Acetylene Welding Plant—
Imperial Light, Ltd., 123, Victoria St., S.W. "Edibras, Phone, London." Victoria 3540.

Aeroplane Manufacturers—
Aircraft Manufacturing Co., Ltd., Hendon. "Airmanship, Hyde, London." Kingsbury 180.
Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne." Gosforth 500.
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich "Aviation, Norwich." Norwich 851.
British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol." Bristol 3096.
British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudroplan, Crickle, London." Hampstead 5551.
Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6. Hampstead 4728.
Davidson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1144-1145
Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1176.
Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 120.
Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophil, Crickle, London." Hampstead 7420.
Mann, Egerton & Co., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
Martinsyde, Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge." Woking 331; Byfleet 171.
National Aircraft Co., Ltd., 15, Hackney Road, N.E.2. London Wall 6725.
"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London." Willesden 2455.
Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 38.
The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis, London." Putney 2240-2241.
Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester." City 8530-8531, Manchester.
Sage, Frederick & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes." Cowes 193.
Short Bros., Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London." Regent 378.
Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston." Kingston 744.
Standard Aircraft Manufacturing Co., Effingham House, Arundel Street, W.C.2. "Gunsaignush, Estrand, London." City 89.
Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickerfyta, Knights, London." Kensington 6810.
Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.
White, J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes." Cowes 3.

Airships—
Airships, Ltd., High Street, Merton. Wimbledon 1314.
Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, 'Phone, London." Regent 378.

Aluminium Castings—
Coan, R. W., 219, Goswell Road, London, E.C.1 "Krankases, Isling, London." City 3846.

Aluminium Presswork (Stampings, Etc.)—
Willans & Robinson, Ltd., Victoria Works, Rugby. "Willans, Rugby." Rugby 112 (3 lines).

Bearings (Etonia Cast Phosphor Bronze)—
Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3927.

Brass Sheets for Tipping Propellers—
Lucraft, H., & Co., 147, Fenchurch Street, London, E.C.3. "Lucraftia, London." Avenue 2217.
Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 695, 696, and 7066.

Buildings—
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation Norwich." Norwich 851.
Fairby Construction Co., Ltd., 117, Victoria Street, S.W.1. "Bizfield, London." Victoria 8868.
Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
The Whitley Co., Ltd., Salisbury House, London Wall, E.C.2. "Wrathless, Phone, London." City 2681-2

Cable Coverings and Cable Controls—
Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Capstan Work—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Carburettors—
Hobson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.

Castings—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Lucraft, H., & Co., 147, Fenchurch Street, London, E.C.3. "Lucraftia, London." Avenue 2217.

Castings (Aluminium, Brass, Bronze, Machined or Rough)—
Coan, R. W., 219, Goswell Road, London, E.C.1. "Krankases, Isling, London." City 3846.
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham." Central 1223.
Willans & Robinson, Ltd., Victoria Works, Rugby. "Willans, Rugby." Rugby 112 (3 lines).

Cellon—
Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawb, London." London Wall 5359-3622.

Celluloid (Non-Flam.)—
Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7.
London Label Co., Beckton Road, E.16. "Lonlabel, Canning, London." East 1300.

Clothing—
Burberry's, Ltd., Haymarket, S.W.1. Regent 2165.
Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6.
Hazell & Co., 4, Princes Street, Hanover Square, W.1. Mayfair 4071-2.
Robinson & Cleaver, Ltd., Regent Street, London, W.1. Gerrard 1070.

Component Parts—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (4 lines).
B. D. V. Aircraft Spares, Syon Chambers, 16a, Kew Road, Richmond, Surrey. "Aeros, Richmond." Richmond 1681.
Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6. Hampstead, 4728.
The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aerarcaos, Canning, London." East 1300.
The Osborne Aircraft Co., Ltd., Whin Hill, Greenock, Scotland. "Cordage, Greenock." Greenock 618.

Cords, Tapes, and Threads—
MacLennan, J., & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.

Dopes—
British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard 2312.
British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellutate, London." Regent 4046.
Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawb, London." London Wall 5359-3622.
Clark, Robert, Ingham & Co., Ltd., Caxton House, S.W.1. "Pearline, Vic, London." Victoria 2923.

Electrical Accessories—
Mann, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Eusroad, London." Museum 70.
Premier Electric Heaters, Ltd., 258, 259, and 360, Bradford Street, Birmingham. "Fahrenheit, Birmingham." Midland 681.
The Edison Swan Electric Co., Ltd., Ponder's End, Middlesex. "Ediswan, Enfield." Enfield 520 (6 lines).

Electric Cables—
E. Kalker & Co., Coventry. "Kalker, Coventry." Coventry 24x.

Engines and Parts—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford. "Pump, Bedford." Bedford 88.
Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.
The Beatty School of Flying Ltd., The Broadway, Cricklewood, N.W.2. Hampstead
Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, Londo Gerrard
Dudbridge Iron Works, Ltd. (Salmson), Victoria Street, London S.W.1. "Salmson, Flight, Vic, London." Vic
Gordon Watney & Co., Ltd., Weybridge. "Mercédès, Weybridge." Weybridge 550 (7 lines).
Green Engine Co., Ltd., Twickenham. Richmond
Gwynnes, Ltd., Hammersmith Iron Works, Hammersmith, W. "Gwynne, Hammersmith, Hammersmith
Rolls-Royce, Ltd., 14 and 15, Conduit St., W. "Rolhead, London." Gerrard 160
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent
Sturtevant, B. F., Co., Ltd., Hyde Park, Boston, U.S.A. Museum 70.
Sunbeam Motor Car Co., Ltd., Wolverhampton. "Moorfield, Wolverhampton." Wolverhampton
The Gnôme & Le Rhône Engine Co., Ltd., 47, Victoria Street, S.W. "Elevon, London." Walthamstow 408 (3 lines).
Willans & Robinson, Ltd., Victoria Works, Rugby. "Willans, Rugby." Rugby 112 (3 lines).

Flexible Shafts—
Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch

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Cowper-Coles Manufacturing Co., Sunbury-on-Thames. Sunbury

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Chas. P. Kinnell & Co., Ltd., 65 & 66, Southwark Street, London, S.E.1. "Kinnell, London." Hop 372 (3 lines).

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Magneto Driving Pieces—
Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch

Magnetos—
The M-L Magneto Syndicate, Ltd., Victoria Works, Coventry. "Corlton, Coventry." Coventry 1008
The British Lighting & Ignition Co., Ltd., 204, Tottenham Court Road, W.1. "Lumag, Phone, London." Museum

Metal Manufacturers—
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Metals in General—
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Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 695, 696, and

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Rubery, Owen, & Co., Ltd., Darlaston. "Roofs, Darlaston." Darlaston 87.
Sankey, Joseph, & Sons, Ltd., Wellington, Salop. Shropshire. "Sankey, Wellington, Salop." Wellington 66.
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.
The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aerarcaos, Canning, London." East 1300.
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Wooler Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction. N.W.10.

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Montgomery, Smith, & Co., Ltd., Tangent Works, Keynsham, near Bristol. "Ingenuity, Salford." Keynsham 21.

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Metric Bolts—
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Brown Bros., Ltd., Great Eastern Street, E.C.1. "Imbrowned, Bethroad, London." London Wall 6100.
Edison Swan Electric Co., Ponder's End. (Lamps.) "Ediswan, Enfield." Enfield 520 (6 lines).
Endolithic Manufacturing Co., Ltd., 61½, Fore Street, London, E.C.2. Labels in Metal, Ivory, Ivorine, etc.
Herbert Broad Co., Ltd., Chapel-en-le-Frith. "Frodebarke, Birmingham." Central 703.
Glasso Manufacturing Co., Ltd., 211, City Road, E.C. City 9558.
London Label Co., Ltd., Harley Works, Beckton Road, E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.
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Mann, Egerton & Co., Ltd., 379/381, Euston Road, London, N.W.1. "Manegecar, Euston, London." Museum 70.
Standard Motor Car Co., Coventry. "Flywheel, Coventry." Coventry 530 (4 lines).

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The Clegg Metal Engraving Co., Chatsworth Works, Worthing. "Clegg Worthing."

Observation Panels—
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Patent Agents—
King's Patent Agency, 165, Queen Victoria Street, E.C.4. Central 682.
Page & Rowlingson, 27, Chancery Lane, E.C.4. Central 332.
Stanley Popplewell & Co., 38, Chancery Lane, W.C.2. Central 1763.

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Piston Rings—
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Power Presses and Dies—
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Presswork—
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers—
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Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.
Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.
Integral Propeller Co., Ltd. "Aviprop, Hyde, London." Hendon 9. Kingsbury 104.
Lang Propeller, Ltd., Weybridge. "Aerosticks, Weybridge." Weybridge 520-521.
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich" Norwich 482 (4 lines).
Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 291, Leeds.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

Rigging for Aircraft—
Cradock, G., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466.

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Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.

Sand and Die Castings—
Coan, R. W., 219, Goswell Road, London, E.C. "Krankases, Isling, London." City 3846.

Scientific Instruments—
The Foster Instrument Co., Letchworth, Herts. "Instrument, Leeds." Chapeltown 474.

Seaplane Manufacturers—
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The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 38.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.
Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton." Southampton 1337.

Seats for Aeroplanes—
Bowser, E., Art Cane Works, 30 Park Lane, Leeds. Central 3437.

Shackles—
The British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow. "Golshel, Hounslow." Hounslow 254.

Sheet Metal Pressings—
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Shock Absorbers (Elastic Cord)—
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Ripault, Leo, & Co., Ltd. (Oleo Plugs), 62a, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758.

Springs—
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Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Steel—
Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237.
Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham." Smithwick 224.

Steel Tension Wires—
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Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Entikosil, Vic, London." Victoria 5073, 4210.
Brown, R. F., & F. W., Wollaton Saw Mills, near Nottingham. "Brown's Saw Mills, Wollaton." Nottingham 1526.
J. Owen & Sons, Ltd., 109a, Borough High Street, S.E.1. "Bucheron, London." Hop 3811 (2 lines).

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Varnishes—
Clark, R. Ingham, & Co., Caxton House, S.W.1. "Pearline, Vic, London." Victoria 2923.
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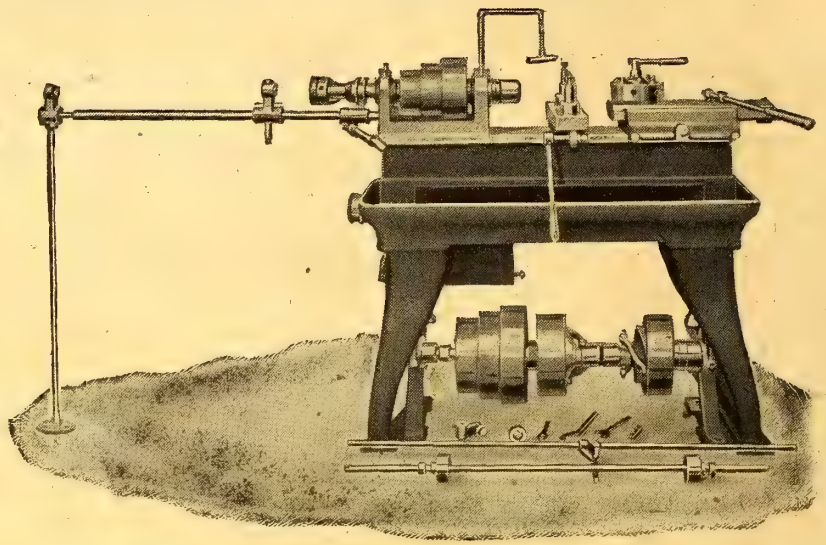
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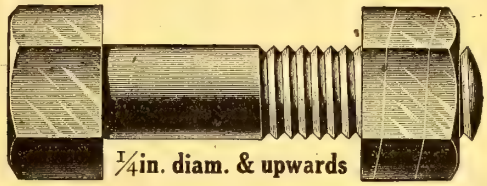
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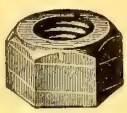
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triplane construction consists therein that the unfavourable turning it out almost wireless. Another advantage of the relation of the chord to the span turns here out better, as there is now a triple span owing to the addition of a third plane; for though the proportion shall not be less than 1.6, it has in most cases of aeroplanes of very small span to be reduced. Thus the chord amounts in the Sopwith triplane to little over 1 metre by a span of 8 metres.

"The increased head resistance of the planes is neutralised by the employment of single struts and simplified wiring. By employing the Curtiss strut construction wiring is in but one level, as is evident from the side view. By the smaller loading of the planes the main spars can finally be built pretty light and allow yet comparative large free spans, the Sopwith triplane about 2.75 metres with a free end of 1.40 metres. The weight of the total planes should therefore even be scarcely higher than biplanes of the same dimensions.

"Perhaps the plane arrangement affords the pilot a better view, as the middle plane lies in the level of the head, and the top and bottom planes hide less of the range of view by their smaller chord than the normal planes of small biplanes.

"Sopwith has a diagonal wire bteween the top and bottom strut junctions (see the below illustration), which we do not find in Curtiss, as mentioned already. While the two strain wires pass in front of the middle plane the opposite wire is pulled through the latter. A forward inclined diagonal wiring is arranged between the two inner struts, rising on the body sides, while the wires leading behind are not crossed. As evident from the scale drawings the planes are staggered about 25 per cent. at an intermediate space of 0.9 metre and all carry ailerons, connected by vertical steel bands, at their ends.

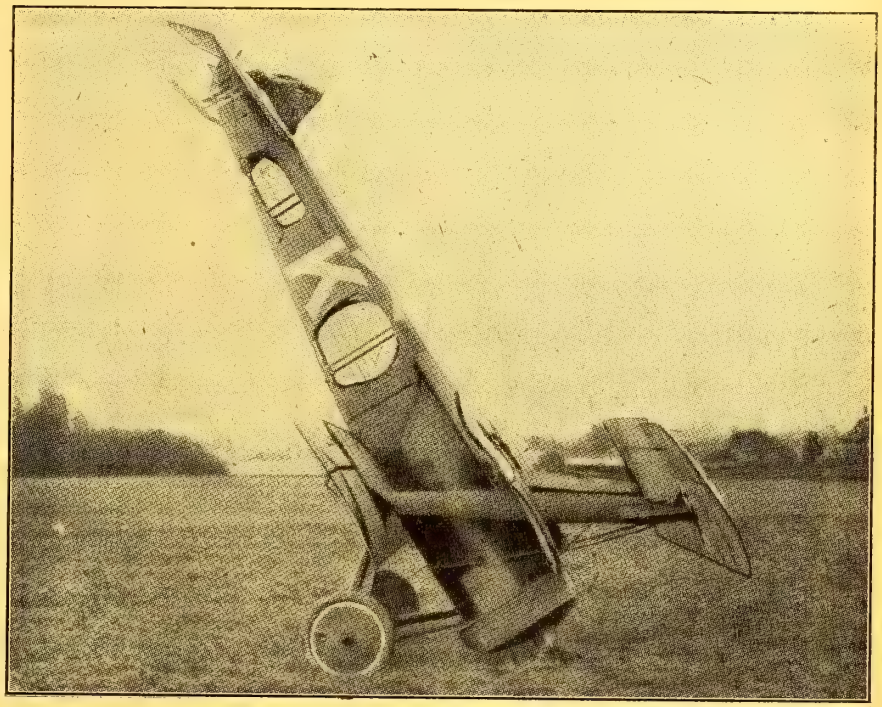
"The triplane has a small dihedral, but no arrow shape of the planes. The body carries a 110 h.p. Clêrget rotary engine in front, housed in a round cowl, overhanging the body for the purpose of diverting the air.

"The body is of square section, passing over in the rounding of the motor housing forward by means of light wooden ribs to both sides. The body has width of 0.7 metre and slenders backwards to a vertical edge to which the rudder is attached with a fin in front.

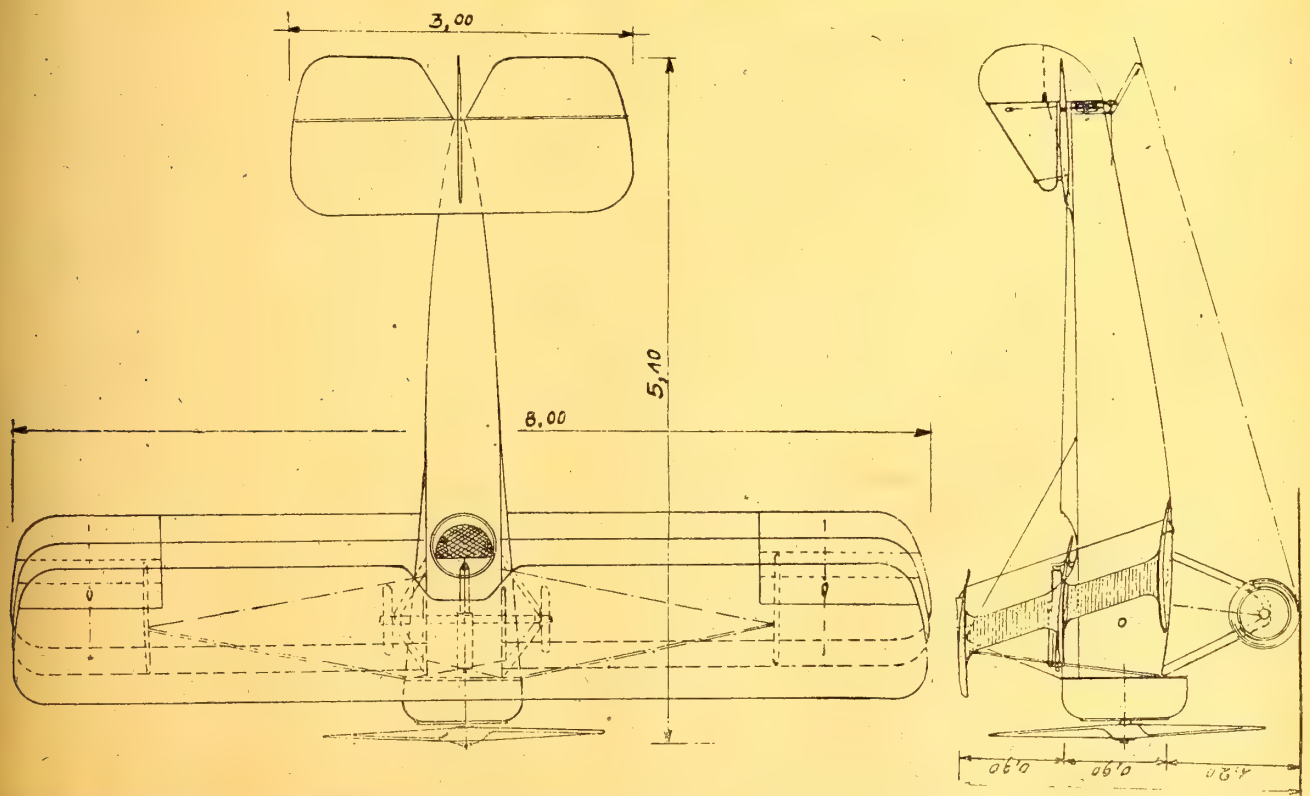
"The elevator is built in two parts and has before it a fixed tail plane, 3 metres broad, the angle of which can be varied during the flight as in all Sopwith aircraft.

"The area of surface of the Sopwith triplane amounts to 27 square metres, the weight full loaded to about 670 kilos, the load of the planes being thus only 25 kilos per square metre. A high speed and a very good climb can no doubt be attained by this small load. Exact news of performance have not been published so far.

"The triplane is turned out both as single-seater and as two-seater, and is always armed with a fixed gun in front, lying on the body in the two-seated model, with a further turnable one for the observer, when the weight full loaded is increased by about 100 kilos.



Side View of a partly-burnt Sopwith Triplane.



Plan and Side Elevations of a Sopwith Triplane. Dimensioned in Metres. Reproduced from the "German Airmen's Journal."

"As in all Sopwith aeroplanes the undercarriage consists of two steel knees and of a divided wheel shaft, the links of which are tightened to the body.

"Up to this date the Sopwith triplanes are not much represented at the front and only about five or six are shot down each month. Whether it shall be engaged on the front in quantities depends likely from the experiences gained of it on active service, of which the foreign press has not yet reported."

THE AIRCRAFT INDUSTRY AND EXCISE DUTY ON PETROL.

By T. KEMP WALTON, A.C.I.S.

Under Section 85 of the Finance (1909-10) Act, 1910, any person using motor spirit for purposes other than supplying motive power for motor-cars shall be entitled, in accordance with the provisions of the section, to an allowance or repayment of the *whole of the duty* paid in respect of the petrol used. And, further, any person using motor spirit for any of the purposes mentioned in Part I of the Fifth Schedule to the Act shall be likewise entitled to an allowance or repayment of *half* the amount of the duty paid in respect of the spirit.

Included in the purposes set out in Part I of the Fifth Schedule is that of supplying motive power to a motor-car which is constructed or adapted for use, and is used solely, for the conveyance of any goods or burden in the course of trade or husbandry, and whereon "the Christian Name and Surname and place of abode or place of business of the person, or the name or style and principal or only place of business of the company or firm keeping the same shall be legibly and visibly painted in letters of not less than one inch in length."

Aviation Petrol.

Under Sub-section 3 of Section 85 of the Act, to which reference has been made, "If any person proves to the satisfaction of the Commissioners that he has within the previous six months used any quantity exceeding five gallons of spirit which is motor spirit within the meaning of the Act for purposes other than supplying motive power for motor cars, or in other circumstances entitling him to the repayment of the full amount of duty in respect of the spirit, he shall be entitled to obtain from the Commissioners a repayment of any duty which has been paid in respect of the spirit and if any person proves to the satisfaction of the Commissioners that he has within the previous six months used any quantity exceeding five gallons of motor spirit for the purposes mentioned in Part I of the Fifth Schedule to the Act, and that the full duty has been paid upon the spirit so used, he shall be entitled to obtain from the Commissioners a repayment of half the amount of duty so paid."

How to Get Money Back.

As some firms in the Aircraft Industry may not be aware that the price they pay for petrol includes the sum of sixpence per gallon for Excise duty, and that in respect of the majority, if not all, of this spirit repayment of the whole or part of the duty could be obtained, the method of claiming repayment is briefly explained:—

Application should be made to the Local Officer of Customs and Excise for copies of forms 232 and 232a, which are provided for the purpose of making claims for repayment of the full amount of duty and half the full duty respectively.

Claims must include only petrol used within a period not exceeding six months immediately preceding the date of the claim and the forms when completed must be returned to the Local Officer of Customs and Excise.

For the assistance of those filling in the forms for the first time, it may be mentioned that it is now necessary to fill in the front side only, as the particulars provided for upon the back are not now required by the Customs and Excise authorities.

Neither is it necessary to annex the Duty Certificates (which should be received with every delivery of petrol). These certificates should, however, be carefully preserved, as the officer when verifying the claim with the claimant's records, may desire to inspect them.

The records must show to the satisfaction of the Excise Officer the purposes for which the petrol to which claims relate has been used.

Repayment of the full duty of sixpence per gallon can be obtained upon all the petrol used in testing and flying aircraft, and in any manufacturing processes in connection with construction.

And a repayment of half the duty, amounting to threepence per gallon, can be obtained upon the spirit used for commercial cars and lorries upon which the owner's name and address appear. These are cars in respect of which the Local Taxation Licences need not be taken out.

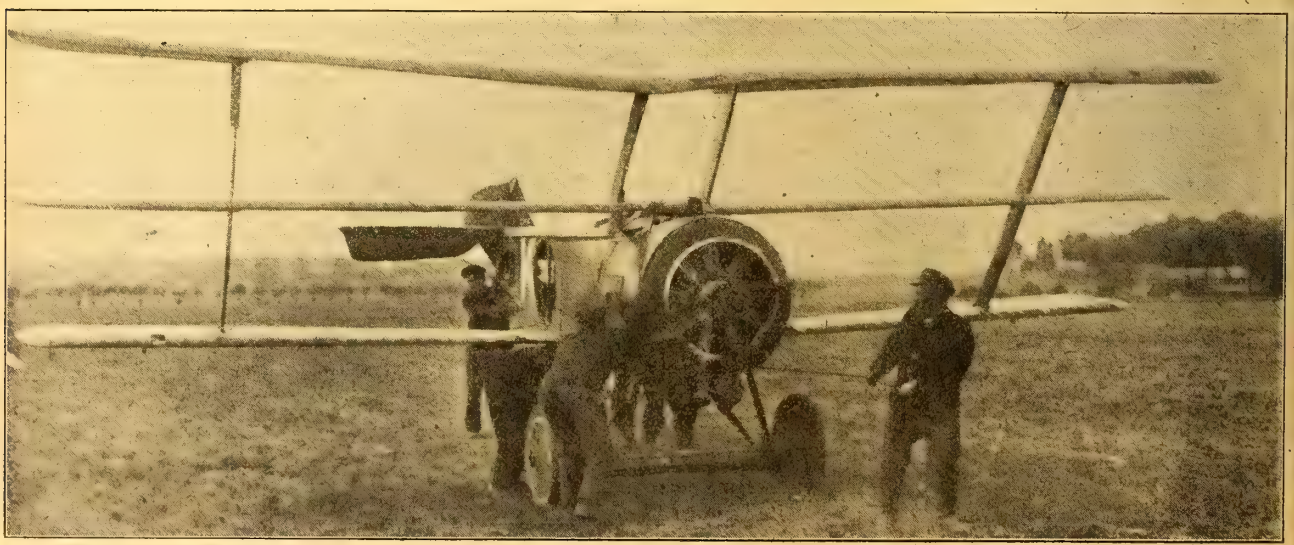
No repayment of duty will be made in respect of petrol consumed by private motor-cars used by the claimant's managers and officials, although for the purposes of business only.

No difficulty will be experienced in getting claims settled if the records are clear and in a simple form.

RECEIVED			ISSUED										Balance in Stock
								Motor Cars.					
Date	Gallons	From	Date	Ref. No.	Gallons	Testing Aircraft	Manufacturing	No.	No.	No.	No.	No.	No.	

A Sample Petrol Stock Sheet.

It has been found in practice that a stock book ruled as above answers very well, as the inspector has only to check the various totals and agree them with the claims.



Front View of the Captured Sopwith Triplane, illustrated and criticised hereinbefore.

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KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

THE PATENTS INDEX.

The subjoined list of inventions has been specially compiled by The Aeroplane from the current Official Patents Records.

Patent Applications.

Addis, W. A. Fuselage cable or wire holder. No. 13598. Sept. 21st.

Austin Motor Co. Aeroplane-engine cowls. No. 13637. Sept. 22nd.

Blackburn Aeroplane and Motor Co. Attachment devices for constructional connections of aircraft. No. 13299. Sept. 17th.

Blackburn Aeroplane and Motor Co. Attachment devices for constructional connections of aircraft. No. 13300. Sept. 17th.

Blackburn Aeroplane and Motor Co. Attachment devices for tension members, wires, or stays of aircraft, etc. No. 13301. Sept. 17th.

Blackburn Aeroplane and Motor Co. Couplings or connections for tension wires of aircraft, etc. No. 13303. Sept. 17th.

Blackburn Aeroplane and Motor Co. Operating mechanism for rudders of aircraft. No. 13302. Sept. 17th.

Blackburn Aeroplane and Motor Co. Manufacture of aircraft, etc., propellers. No. 13605. Sept. 21st.

Brewer, G. Aircraft. No. 13613. Sept. 21st.

Daimler Co. Cylinders for internal-combustion engines on aircraft, etc. No. 13377. Sept. 18th.

Daimler Co. Cylinders for internal-combustion engines on aircraft, etc. No. 13470. Sept. 19th.

Evans, A. S. Automatic compass course setter for aeroplanes, ships, etc. No. 13533. Sept. 20th.

Feure, G. de. Aeroplanes. No. 13296. Sept. 17th.

Gledhill, A. H. Apparatus for releasing bodies from aircraft. No. 13371. Sept. 18th.

Gorst, J. Instrument for measuring distances in azimuth and altitude. No. 13454. Sept. 19th.

Hides, W. F. Aeroplanes. No. 13426. Sept. 19th.

Martin, J. V. Aeroplanes. No. 13493. Sept. 19th.

Mellersh, O. L. Aircraft. No. 13543. Sept. 20th.

Mundy, A. W. Airscrews or propellers for aeroplanes, etc. No. 13512. Sept. 20th.

Pessell, R. C. Apparatus for detaching parachutes, etc., from aeroplanes. No. 13466. Sept. 19th.

Rhodes, W. J. Magnetic seaplane torpedo. No. 13353. Sept. 18th.

Robinson, D. Toy flying-machines. No. 13577. Sept. 21st.

Complete Specifications Accepted, Prints of which can be obtained on and after October 11th, 1917.

109,492. Sept. 20th, 1916. Waterlow, C. M. Airships.

109,496. Sept. 23rd, 1916. Longmore, A. E., and Trussler, F. Apparatus for saving life on aerial craft.

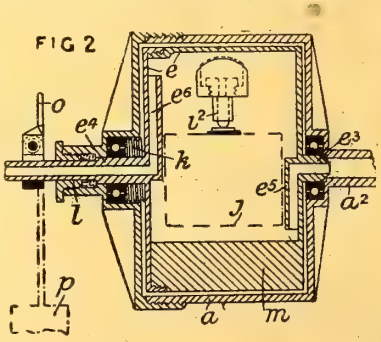
109,503. Sept. 30th, 1916. Maclaren, N. H. W. Propelling means for aircraft.

Abridgments of recently published Specifications.

108,155. Internal-combustion Engines. Roesch, G., 70, Avenue de la Grande Armée, Paris. June 19th, 1917. No. 8820. Convention date, June 24th, 1916. Not yet accepted. Abridged as open to inspection under Sect. 91 of the Act. [Class 7 (iii).]

Carburetting. — Float-feed apparatus for carburettors of aircraft and other engines is so constructed that the float-chamber is maintained by gravity always in the same position irrespective of the inclination of the vehicle on which it is mounted. A casing *a* is fixed with its axis at right-angles to the longitudinal axis of the vehicle and encloses a cylindrical float-chamber *e* containing a float *j* and float valve l^2. The float-chamber is mounted on ball-bearing trunnions e^3, e^4, the end of the trunnion e^3 being coned and forced by a spring *k* against a seating in the pipe a^2 which leads to the carburettor. Fuel enters the space between the casing and float-chamber through an inlet formed in the casing and having its axis at right-angles to the axis about which the float-chamber rotates. The float-chamber is maintained always in the same position by an inside counterweight *m* or an outside weight *p*, or both together, a pointer *o* indicating the relative positions of casing and float-chamber. The pipe e^3 is extended by a radial pipe e^5, and the pipe e^4, which is open to atmosphere by a radial pipe e^6. A stuffing-box is provided at *l*.

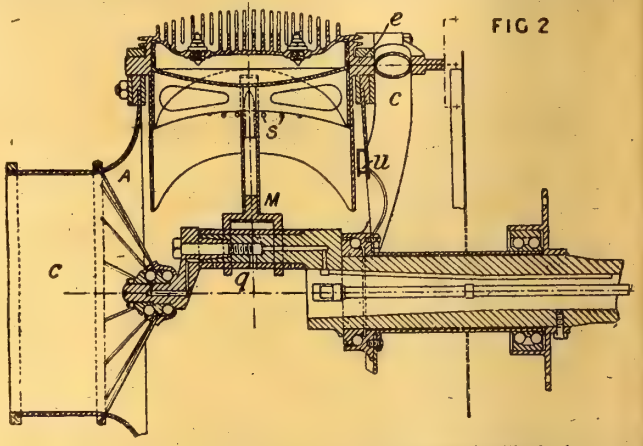
FIG 2



108,158. Internal-combustion Engines. Schultz, E. J. A., Chalons-sur-Marne, Marne, France. July 9th, 1917, No. 9899. Convention date, July 11th, 1916. Not yet accepted. Abridged as open to inspection under Sect. 91 of the Act. [Classes 7 (ii), 7 (iii), 7 (vi), and 122 (i).]

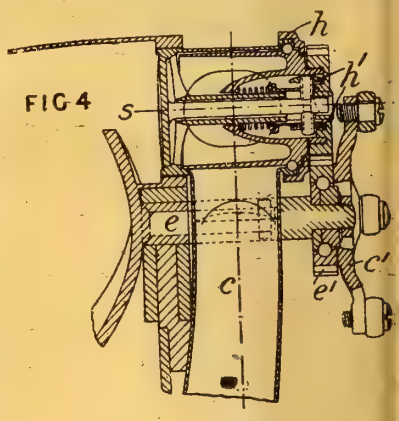
Four-stroke-cycle Engines; Pumps; Valves; Valve-gear; Cylinders, cooling and construction of.—Engines for aircraft have radial cylinders which revolve about a stationary crank-shaft and also oscillate about trunnions *e* adjacent their

FIG 2



closed ends. The cylinders, which may be of elliptical cross-section, carry cooling ribs on the portions of their heads facing the direction of running. Air for cooling and the formation of the charge enters the crank-casing A through a large orifice C containing fan blades, the air being subsequently carburetted by fuel supplied to troughs *u*, and then admitted to the cylinders through pipes *c*, the effect of centrifugal force in which augments the pressure of the entering charge. The combustion gases escape through terminal ports *s* and also through a combined inlet and exhaust valve S, shown in Fig. 4. Located behind the valve S, which is actuated by a cam on a gear wheel h^1, is an intermittently-rotated valve *h* which opens into the atmosphere and also to the admission pipe *c*. The valve *h* is geared to a wheel e^1 carrying arms c^1 having rollers which engage striking-plates, not shown, every half revolution. To secure the connecting-rods to the crank-pin, the rod shown in Fig. 2 is bifurcated and fixed to a sleeve *q*, the ends of the other rods being disposed three inside and three outside the end M. The ends each surround the crank-pin and have projections which engage recesses in adjacent ends to facilitate interlocking.

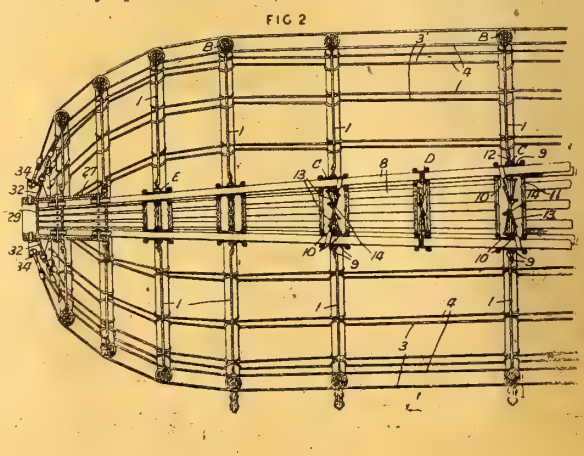
FIG 4



108,259. Aeronautics. Rooney, J., Naval Hospital, Twenty-fourth Street, Washington, U.S.A. Nov. 23rd, 1916, No. 16792. [Class 4.]

Aerial Machines with Aerostats; Aerostats.—A rigid airship, of the type comprising a tapering axial member built up of longitudinal struts secured to a series of stiffening-rings and connected by spokes to a series of external rings braced together

FIG 2

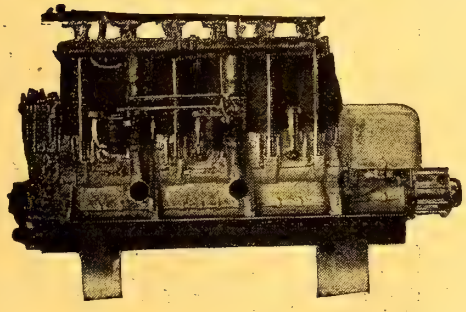




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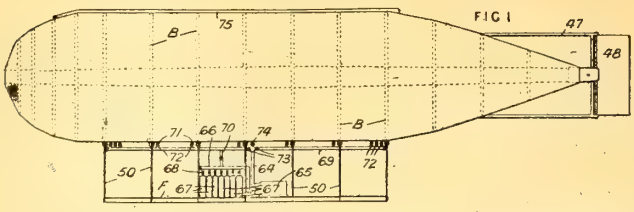
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C.D.C.

FIG 1



by longitudinal wires, is provided with a special construction of stiffening-rings, and with a pendant car carrying means for storing excess gas from the gas-bags and for returning such gas to the gas bags when required. The axial member comprises tubular struts 8 connected by stiffening-rings C, D, E. The rings C are composed of pairs of outer and inner circular channels 9, 10, connected by end plates 11 and an intermediate plate 12, which is connected to the spokes 1 secured to external rings B. The rings 11 may be strengthened by spokes 13 attached to a hub 14. The rings D, E are of similar construction, the former being without intermediate plates. The ends of the axial member abut against end plates 29 of caps 27, which carry anchoring-plates 32, 34 for the ends of the outer and inner series 3, 4 of longitudinal wires, which are coiled round the rings B. Excess gas from the gas-bags may be compressed into containers 67, Fig. 1, by means of pump 65, from which lead pipes 64, 66, the former being connected through valves 73 with a feed-pipe 69 and through a valve 74 with an exhaust pipe 56, Fig. 7, and the latter being connected through valves 68, Fig. 1, to the containers 67 and by a pipe 70 to the feed-pipe 69. The gas-bags, 55, Fig. 7, are connected by pipes 57 to the exhaust pipe 56 through spring-controlled valves 58 adapted to open automatically when the pressure in the gas-bags exceeds a certain amount. Branch pipes 71 lead from the pipes 57 to the feed pipe 69 and are fitted with valves 72. When excess gas is to be pumped into the containers, the valve 74 is opened and the valves 73 closed; but when gas is to be pumped back to any of the gas-bags, the valve 74 is closed and the valves 73 and the appropriate valves 72 are opened. A ventilating-hood 75, Fig. 1, open at each end is provided along the top of the airship. Fins 47 and a rudder 48 are fitted at the stern.

FIG 3.

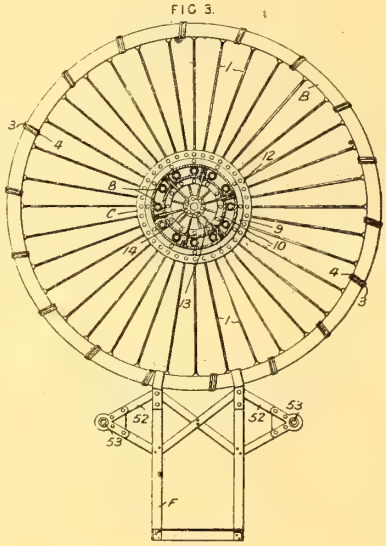
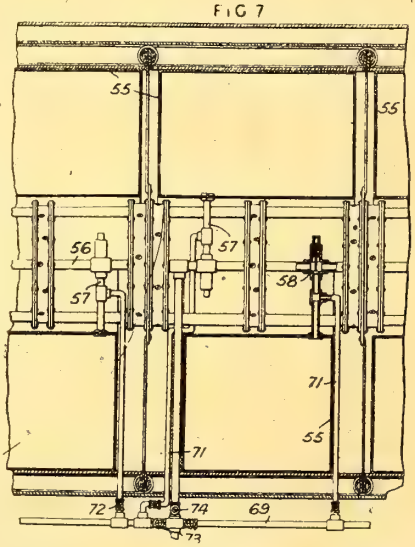


FIG 7



Cars.—The car F may be constructed of angle-iron, the uprights 50 being secured to the rings B of the airship frame.

Propelling.—The propeller shafts are mounted in bearings 53, Fig. 3, in brackets 52 secured to the car F.

A.G.S. PARTS.

Aircraft constructors should note that Brown Brothers of Great Eastern Street hold large stocks of A.G.S. No. 136 Thimbles, and quantities can be supplied from immediate stock at distinctly competitive prices. Large deliveries of all sizes, passed A.I.D., can be supplied at very short notice.

MARKET REPORTS.

Prices given are for quantities on usual terms.

September 27th, 1917.

COPPER.—The authorities in America have now fixed the price of copper at 23½ cents f.o.b., subject to revision in four months' time, this price also to be charged to the Allies. This certainly can be considered a fairly liberal price and should remove any possibility of output suffering in consequence of price. The question of output is certainly a very serious consideration at the present time. The refineries are short of raw copper owing to the various strikes, and the stocks which they had accumulated are rapidly diminishing; on the other hand, the consumption is reaching abnormal figures. One still hears reports of the possibility of the United States Government endeavouring to restore peace, but nothing definite appears to have been done, and in any case it will probably take months before the maximum production is reached.

As foreshadowed in The Aeroplane of September 5th the authorities here have reduced the price Standard £10 to £9 10s. This, of course, has been rendered necessary owing to the U.S. price having cut the price ruling here.

Comparative Prices.

To-day	£110 per ton.
Last month	£120 per ton.
Last year	£116 per ton.
1916 highest	£153 per ton.
1916 average	£116 per ton.

TIN.—There is still a very apparent feeling of uncertainty about this market. After declining from £246 5s. September 17th to £243 September 20th, the market became rather lively and prices have advanced to £247 10s.

It is reported that large shipments of tin are arriving, and when they are delivered the situation should be eased, although in view of the anticipated rise in freights, buyers will probably endeavour to secure as much near tin as possible.

Comparative Prices.

24th September	£247	10	0
20th September	243	0	0
14th September	245	5	0
Highest prices, 1916	205	0	0

LEAD.—Regarding the recent order giving the Ministry of Munitions authority to take possession of all Pig Lead, Old and Scrap Lead and Lead residues, the regulations applying to White Lead, Red Lead and Lead Compounds appear to have been misunderstood. Where White Lead, Red Lead or Lead Compounds are required for urgent repairs or renewals, they can only be purchased or used after a special licence has been procured from the Ministry of Munitions authorising the sale.

One understands that these licences will only be issued where there is definite proof that damage to property will result if the material is not supplied. Official prices remain the same, and it is now "up to" the Ministry to see that firms requiring Lead for national purposes are kept supplied. For Prices, see Prices Current List.

STEEL.—Supplies appear to be steadily increasing and the general feeling that the output would be in excess of the demand by the end of the year looks like being realised; of course, a great many things may happen before then.

The price of American Semi-Steel has been reduced £4 per ton, but even a large reduction like this does not bring the price within reasonable limits; furthermore, one understands that the American authorities have prohibited the exportation of iron and steel. There does not therefore appear to be any hope of American supplies relieving the general steel situation.

The Swedish position remains unsettled; this, of course, principally affects Cast Steel, and although the supplies of Ore received from Sweden were only small, they were very helpful. Should the authorities here decide to prohibit any exportations to Sweden, it is only natural to expect that our Ore imports from there will cease.

For Prices see Prices Current List.

TIMBER.—One now learns that the question of a substitute for Silver Spruce has been settled. No official instructions appear to have been issued, but we should not be surprised to learn that a formerly discarded wood was decided upon. Makers used this wood in the early days, and it apparently gives excellent results, although it does not possess all the splendid features of Silver Spruce. By the way, it would be interesting to know what the authorities intend doing with all the Spruce which was imported for aircraft work. One is given to understand that although this material was passed by three Government Inspectors, it was found upon arrival to be nearly useless for the purpose for which it was purchased.

There have been several loads of Mahogany and Walnut received during the past week. Supplies of the latter are, however, still very small compared with the demand.

Prices remain very firm; for present prices see Prices Current List.

Telegrams "Aviation" Norwich. 'Phone No 851 Norwich



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TELEGRAMS: "GWYNNE, LONDON."

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

FABRIC.—Apparently the authorities have not yet succeeded in settling the Irish labour dispute and the position is becoming extremely serious. The stocks held by the various factories cannot be very large.

One still hopes for an early settlement and is given to understand that everything possible is being done to achieve this.

CURRENT MARKET PRICES.

(For Week Ending Sept. 27th.)

The prices given below are the prices ruling on the above date.

TERMS.—Usual for the various materials mentioned.

Prices of old metals are as quoted by scrap dealers.

Prices must not be taken as specific quotations for definite quantities delivered to any part of the country.

Aluminium.

Ingot	£225 per ton.
Remelted	£210 per ton.

Brass.

Sheets	15⅜d. per lb.
Strip	14⅞d. per lb.
Wire	15¼d. per lb.
Tubes	16d. per lb.
Castings	15d. per lb.
Turning Rod	14¾d. per lb.
Brazed Tubes	20½d. per lb.

Copper.

Ingot, Standard, Cash	£110 per ton.
Ingot, Standard, 3 mos.	£110 per ton.
Best Selected (nett)	£128 to £124 per ton.
Sheets	£155 per ton.
Wire	17½d. per lb.
Tubes, S.D.	19d. per lb.
Tubes, Brazed	19¾d. per lb.
Rivets	1s. 11½d. per lb., basis.
Tacks	1s. 11d. per lb.

Fabric.

Linen, R.A.F., 17C, Spec., 36-in. wide,	2s. 8d. p. yd.*
Linen, R.A.F., 17C, Spec., 38-in. wide,	2s. 9½d. p. yd.*
Spaced, R.A.F., 17C, Spec., 37½-in. wide,	1s. 9d. p. yd.*

Gun Metal.

Castings	1s. 8d. per lb.

Lead.

Virgin Pig	£29 per ton, c.i.f.
Virgin Pig	£30 per ton, ex Stores.
Sheets	£39 10s. per ton, D/D.
Pipes	£40 per ton.
Dry White	£46 10s. per ton, less 5 per cent.
White in Oil	£53 per ton (lots over 5 cwt. less 5 per cent.).
White in Oil	£55 per ton (lots under 5 cwt. less 5 per cent.).
Red	£42 per ton, less 2½ per cent.

Nickel.

Nickel	£200 per ton.

Phosphor Bronze.

Ingots, 5 cwt. and under	£159 to £187 per ton (subject to Copper and Tin fluctuations).
Castings	1s. 7d. to 1s. 11d. per lb.

Phosphor Copper.

Ton lots	£210 to £215 per ton.

Silver.

Silver	55d. per oz.

Solder.

Plumber's	103s.
Tinman's	135s.

Steel.

High Speed, 14 p. cent., Tungsten,	2s. 10d. per lb., Basis.*
High Speed, 18 p. cent., Tungsten,	3s. 10d. per lb., Basis.*
Bar, R.A.F., 3A Spec.,	36s. to 40s. per cwt., Basis.†
Bar, R.A.F., 1E Spec.,	78s. to 80s. per cwt., Basis.†
Sheets, R.A.F., 9A Spec.,	30s. to 32s. per cwt.†

Spelter.

English, f.o.b., Birmingham	£57.

Tin.

Tin	£244 15s. per ton.

Tinplates.

Tinplates	30s. Basis, f.o.t.

Timber.

	Official	Merchants.
Silver Spruce,	10s. 4d.	17s. 9d., c.f.‡
English Ash		13s. 6d., c.f.‡
Mahogany,	1s. 6d. to 1s. 10d.,	2s. 2d. to 2s. 6d., s.f.‡
Walnut,	2s. to 2s. 3d.	2s. 3d. to 2s. 6d., s.f.‡

Zinc.

Sheets (American)	£100 f.o.b., New York.

Scrap Materials (London Prices).

Brass, Heavy Selected	£95
Copper, Clean	£102 to £104
Copper, Brazery	£84 to £86
Lead, No Draft	£26
Zinc, Old	£40
Gun Metal	£123

*Official Prices. †Average Prices only. ‡Includes Selection and Delivery.

STANDARD AUTOMOBILE SCREW THREADS.

By V. P. BENEDICT.

A MEMO BY WAY OF CAUTION AND ADVICE.

There appears in many directions a very considerable degree of misunderstanding as to what particular schedule is referred to in the term "Standard Automobile Screw Threads" now frequently applied to aeroplane components on the drawings thereof.

Which uncertainty, doubtless, arises from the fact that the British schedule of Automobile Screw Threads has only recently been officially adopted, so it has not yet had time to make its appearance in existing text books, whereas in most there does appear the older schedule [pronounced in U.S. "skedool."—Ed.] of the American Society of Automobile Engineers, known as S.A.E.

These two schedules—British and American—are totally distinct and differ essentially in form and dimensions.

BY WAY OF CAUTION—

To militate against the possibility of what may conceivably be very expensive mistakes, arising from the cause just mentioned, one recommends to the notice of all concerned, for their own benefit, to be read and noted for future reference, the definite intimation that any term such as "Automobile" or "Standard Automobile" applied to screw threads appearing on aircraft or other drawings and specifications of British design and origin must be taken as referring to the British Standard Automobile Screw Thread Schedule, and *not* to the S.A.E. or Society of Automobile Engineers (of America). [Which now calls itself the Society of Automotive Engineers.—Ed.]

—AND OF ADVICE.

The officially adopted British Automobile Standard Screw Thread Schedule consists simply of sizes ¼ in. up to 1 in., of the British Standard Fine Threads (B.S.F. or B.F.T.) plus numbers 2 and 4 British Association (B.A.) Screw Threads.

The fullest particulars, both of the British and American Standards for Automobile Screws, were included in the detailed Tables of Screw Threads printed in THE AEROPLANE (Aeronautical Engineering Supplement) under issue date September 5th last.

V. P. B.

[It should be noted that copies of the Screw Thread Table compiled by Mr. Benedict, published in this paper recently, and giving full particulars of all the screw threads in use on aircraft, may be obtained from this office on paper suitable for framing or posting up on notice boards, for three penny stamps.—Ed.]

ALEXANDER'S DESIGNS.

From the "Daily Telegraph" of Sept. 19th :—

At Bow Street, on Sept. 18th, before Mr. Graham Campbell, Faedo Cokinaki, aged 29, said to be of Greek nationality, described as a clerk, residing at Elgin Avenue, Maida Vale, was charged with stealing, on Sept. 7th, from an office at Charing Cross Mansions, Charing Cross Road, eleven plans relating to the manufacture of aeroplanes, and four files of letters, valued together at £200, the property of William J. H. G. Browne, A.M.I.C.E., of the firm trading as H. Alexander and Co.

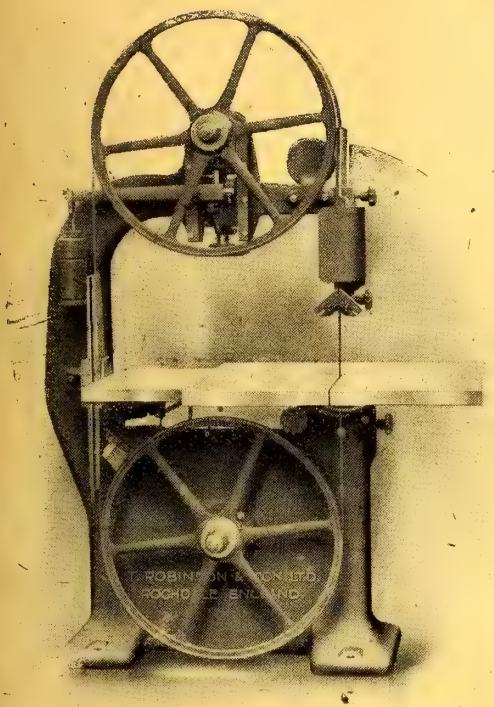
Mr. F. H. Adams, solicitor for the prosecution, explained that Messrs. Alexander and Co. were civil engineers, and had for some time been engaged in patenting and designing aeroplanes and constructing hangars. The defendant occasionally visited their offices, and was there on Sept. 7th whilst Mr. Browne was engaged at work on his plans. Next morning, on returning to his office, Mr. Browne missed the plans and other papers mentioned in the charge. On Sept. 10th he met the defendant, and told him he suspected him of having taken them. Defendant made some reply to the effect that if Mr. Browne could get him payment of a sum of £27 10s. he might be able to tell him where the plans were. Mr. Browne then gave information to the police, with the result that the defendant was arrested.

Mr. A. E. Burton, solicitor, who said he had only just been instructed to appear for the defendant, intimated that his client, who had acted as he had done under an entirely mistaken view of his rights, was prepared on his advice to plead guilty if the magistrate would deal with the case.

After some discussion Mr. Graham Campbell declined to deal with the case, and said defendant must go to the sessions for trial. He agreed to accept bail for his appearance.

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AIRCRAFT FINANCE

VOL I. No. 2. ISSUED AS A SUPPLEMENT TO "THE AEROPLANE"

CURRENT INFORMATION.

THE COMPANIES (PARTICULARS AS TO DIRECTORS) ACT, 1917.

An important addition to the Companies (Consolidation) Acts received royal assent on August 2nd, 1917, which affects every company incorporated on and after November 22nd, 1916, and, in view of the fact that aviation companies are necessarily of recent incorporation, the following particulars are of very great importance to the aeroplane industry. This legislation was enacted to circumvent the manœuvres of concerns in the United Kingdom, carrying on business under trading styles which afforded no real indication of the nationality fo the principals. In December, 1916, when the registration of the Business Names Act was passed, a large number of trading and manufacturing concerns were immediately converted into private companies, with the object of avoiding disclosure of the nationality of their principals, by the cover secured under the Limited Companies Acts. It was at once recognised that by omitting to bring limited companies within the scope of the Business Names Act it permitted if not actually invited those to whom its provisions were unwelcome to convert their businesses into companies, and thus defy the objects for which the Act was passed. The new Act now compels every company registered since November 22nd, 1916, to furnish to the Registrar of Joint Stock Companies the Christian name or names and surname of every director, any former Christian name or names or surname, nationality or origin (if other than the present nationality), the usual residence and occupation of every director. A novel feature of the Act is the definition of what is meant by "Christian name," which is declared by Section 22 of the Business Names Act to cover any forename, and to include members of any non-Christian religion. Hitherto a director's address filed with the Registrar has been accepted as that of the company, but by the new Act the address at which the director "habitually resides" must be given. Under this new Act a director is further called upon to disclose any separate business that he may be interested in or carrying on. Secretaries, directors, and other officials are also notified that any change of director, residence, or occupation must be filed with the Registrar. A wide meaning is given to the expression "director." Section 3 of the present Act is as follows:—

"For the purposes of this Act and of Sections 26, 75, and 274 of the Companies (Consolidation) Act, 1908, as amended by this Act, the expression 'director' shall include any person who occupies the position of a director *and any person in accordance with whose directions and instructions the directors of a company are accustomed to act.*"

Another important point in the Act is that in the case of those companies to which the obligations apply it will now be necessary to set out the names of the directors in all "trade catalogues, trade circulars, showcards, and business letters" in which the name of the company appears, and which are issued or sent to any persons in any part of His Majesty's Dominions. Default in complying with these provisions renders every director, secretary, or other official of the company, who is knowingly a party to the default, liable to a fine of £5 for each offence. Company officials are advised to make themselves conversant with the requirements and obtain the requisite forms without delay.

The Treasury and New Issues.

Last week the official notice issued by the Lords Commissioners of the Treasury, through the medium of the Press Bureau, was given in these columns, and I pointed out that the New Issues Committee will have to revise their present policy if Treasury regulations against unauthorised new issues are to be observed and enforced. These remarks receive ample justification by the publication since this article was written of the annual report of the Controller of the Companies Department of the Board of Trade which has just been published. This report, which deals with the companies registered during the past year, shows that three thousand and eighty-one companies were registered, representing roughly forty-five and a half millions sterling, of which only one hundred and forty companies, representing a total of under the odd five and a half million pounds, were issued by prospectus to the public, clearly showing that close upon three thousand companies, representing in the aggregate over forty millions sterling, were "issued" without a prospectus, consequently, subscribed privately without Treasury approval or consent. In these days of stress and difficulty such a state of affairs ought not to exist, and demands the earliest attention of the authorities.

A Note for the Intelligent Investor.

In the course of a speech made by the Paymaster-General, Sir J. Compton Rickett, at Coventry last week on the subject of the future of the Aircraft industry, this Government official made a statement which must have a very important bearing on the future of Aircraft Finance. In the course of his remarks he stated:

"The aircraft of the future would come not in forties and fifties, but in hundreds and thousands. Chemistry would lighten their weapons, reorganisation of the Air Fleets would include stores, munitions, even ambulance craft, as well as fighting machines; there would be no fortresses to obstruct, no railroads to lay, no rivers to cross, the fate of an Empire might be decided in a fortnight."

Mr. Percival Gibbon, writing in the *Daily Telegraph* on the subject of the Italian Capronis, Says:—

"I asked the aviators, in view of Laureati's success, what they thought of the prospects of those Caproni fliers in America who are to make an attempt to fly the Atlantic. One and all were enthusiastic about it. They

pointed out that by choosing starting and landing places the passage could be done with only about a thousand miles of water to cross. We have already machines which normally go into action with a crew of four men, besides a cargo of bombs. By reducing the crew to two and substituting the bombs and the other two men by extra fuel supply, the thing is obviously possible." They laid stress on the value of multiple engines, and quoted the case of an aviator flying a three-engined machine, which got back safely, though two engines were out of action. 'We shall all be mail-carriers after the war,' said one of them."

This should give the intelligent investor food for reflection.

THE WELLS AVIATION COMPANY, LTD. (*In Liquidation*).

A meeting of the creditors of this company was convened and held at the Cannon Street Hotel on Tuesday, September 25th, at which Mr. H. M. Marriott (solicitor), acting for Mr. Wells, presided. The chairman complained on Mr. Wells' behalf that a proposal submitted by him had not been accepted by the liquidators. The company, it appears, was in financial difficulties in the early part of the year and went into liquidation on May 11th. It was reported that the liquidators had been negotiating with various parties, but all with one exception had proved abortive, and even this group withdrew their offer on the very day that a meeting of the committee was convened to consider the proposal. It appears, however, that on that same day the Aircraft Trust, Ltd., approached the liquidators and propounded a scheme under which the debentures would be dealt with, and would give the creditors approximately 10s. in the £. This was the only proposal before the committee, who comprise nine of the largest creditors, and whose debts total about £20,000. The committee authorised the liquidators to accept the proposal, which I understand they have done, and a deposit of £15,000 has been accepted. The alternative proposal subsequently submitted by the chairman was for the payment to the creditors of 6s. 8d. in the £, the balance to be "secured," but no information was given as to what form the security would take. The chairman suggested it would probably be a second debenture. This gave rise to some very sarcastic and pointed comment. A resolution of confidence in the liquidators was proposed, and an amendment in support of the alternative scheme was also proposed and seconded. The chairman then made reference to certain proxies he held, but it was pointed out from the body of the meeting that to use proxies held on behalf of absent creditors who could have no knowledge of the position without having heard the facts would be a very questionable proceeding, and it was proposed and seconded that the proxies be not used. A solicitor thereupon rose and expressed disgust at the attitude adopted by the chairman, and suggested that the meeting should disperse without considering any further resolutions, whereupon practically the whole of the meeting withdrew. I understand that as soon as the creditors' claims have been agreed, a first distribution will be made of 5s. in the £ to the creditors.

G. A.

NEW COMPANY REGISTERED.

Manchester Aircraft Company, Ltd., registered September 24th, 1917; nominal capital, £5,000 in £1 shares. Registered offices, 29, Cooper Street, Manchester.

ANSWERS TO CORRESPONDENTS.

A Financial Specialist will be pleased to answer in these columns inquiries on any subject affecting or relating to Investments, Stocks, Shares and Securities of Aircraft and kindred companies, free of charge.

"Novice" (Halifax).—It is specifically set out in the Companies Acts that a holder of debentures shall have the same right to receive and inspect the balance-sheet and reports of the Company as is possessed by the holder of Ordinary shares. If these documents are not regularly sent to you, you would be entitled to claim them from the Secretary of the Company. The reading of the Section of the Act, whilst specifically stating that the holders of Preference shares and debentures shall have the same right as is possessed by the holders of Ordinary shares, restricts the right to balance-sheets and reports. You would therefore not be entitled to receive notices of meetings.

"Nemo" (Worcester).—The only obligation on a Company to employ an Auditor is embodied in Section 26, Sub-Section 3 of the Companies Act, which provides that a balance-sheet shall be filed annually with the Registrar of Joint Stock Companies, which shall be audited by the Company's Auditor. There would appear to be some looseness in the wording of this point of law, as it does not define what is an Auditor. Many expert book-keepers and accountants might with very good reason adopt the title, whereas the Act undoubtedly intends that the Company's Auditor should be a member of one of the Institutes, but specially exempts Private Companies, and Section 113 sets out the rights and duty of an Auditor very clearly. However, as a Private Company is specially exempted from filing a balance-sheet, it would appear that such a Company is not legally compelled to employ the services of an Auditor.

"Investor" (Brighton).—No doubt the delay in the issue of the certificates is due to the common cause from which all offices just now are suffering, that of depleted staffs. In normal times share-certificates are usually prepared and delivered in twenty-one days. At present the preparation of new certificates generally demands one month, but for all practical purposes the transfer receipt which you hold covers your position.

"A Flyer" (Norwich).—The present quotation is "ex-div." consequently a purchase at the present moment would not entitle you to receive the dividend just declared, as this dividend would be the property of the seller.

CURRENT QUOTATIONS.

The following are the current quotations made up to Tuesday morning in each week of the principal companies engaged in the Aircraft Industry and Kindred Trades.

Aircraft Mnfg. Co	7% cum. pref. £1 ...	23 -	24/-
Armstrong Sir W. G.) Whitworth & Co., Ltd.	4% cum. pref. £5...	3¼	3½x
	5% 2nd. pref. £1 ...	17/-	18/-x
	£1 ordinary	39/-	40/-x
Austin Motor Co., Ltd.	7% cum. pref. £1...	18/-	19/-
	£1 ordinary	23/-	24/-
Birmingham Small Arms Co., Ltd.	£1 ordinary	54/6	55/6
	5% cum. "A" pref.	4¼	4⅜
	5% cum. "B" pref.	19/6	20/6
Boulton & Paul, Ltd., 5% cum. pref. £1		¾	⅞
Brown Bros., Ltd., 6% cum. pref. £5...		4¼	4⅜
Darracq (A) & Co., (1905) Ltd.	£1 ordinary ...	33/6	34 6
	7% cum. pref. £1 ..	22/6	23/6
Electric Construction Co., Ltd.	7% cum. pref. £1...	⅞	1
	£1 ordinary	⅞	1
Fellows Magneto Co., 8% cum. partip. pref.		17/-	18/-
General Electric Co., Ltd.	6% cum. pref. £10 ...	10	10¼
	£10 ordinary	17	18
Gwynnes, Ltd., 5% cum. pref.		91/-	92/-
Ordinary		8/3	8/6
Greenwood & Batley, Ltd., £10 ordinary		9	10
Humber, Ltd., 6% cum. pref. £1		17/-	18 -
£1 ordinary		18/-	19/-
Napier (D) & Son, Ltd., 7½% cum. pf. £1		17/9	18/3
Peter Hooker, Ltd., £1 ordinary		21/-	22/-
Rolls Royce, Ltd., £1 ordinary		59/-	60/-
Rudge Whitworth, Ltd. £1 ordinary ...		41/-	42/-
Ruston, Proctor & Co., Ltd.	£1 ordinary	26/-	27 -
	5% cum. pref. £1 ...	17/-	17/6
Sunbeam Motor Car Co., Ltd., £1 ord...		88/-	90/-
Straker Squire, Ltd. (1913), £1 ordinary		24/-	24/6
S. Smith & Son, Ltd. (Motor Accessories) £1 ordinary		26/6	27 6
Triplex Safety Glass, £1 ordinary... ...		17/-	18/-
Vickers, Ltd., 5% pref. stock...		78	82
5% pref. shares. £1 ...		18/6	19/-
£1 ordina y		39/-	40/-
Wm. Beardmore & Co., Ltd., 6% c. pf. £1		19/-	19,6

GENERAL INFORMATION.

Armstrong, Whitworth (1916).
Austin Motor (1916).
Rolls Royce.
Rudge Whitworth.
Straker-Squire (1915).
Sunbeam Motor.
Thorneycroft (J. I.) & Co.
Vickers (1915 and 1916).

Owing to the difficulty of estimating liabilities under Finance and Munitions Acts, the accounts will not be ready until a later date.

(x—ex dividend.)

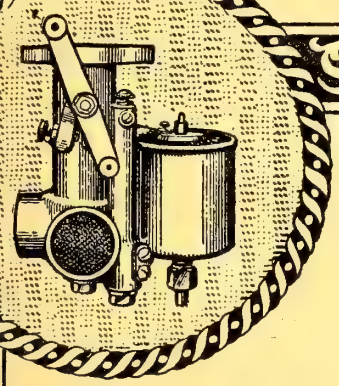
October 2, 1917.

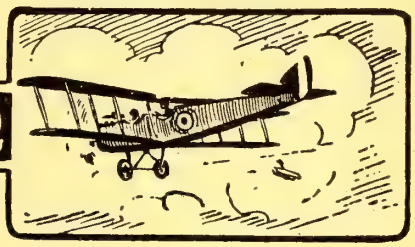
A NEW AIRCRAFT COMPANY.

One takes pleasure in announcing the formation of a new firm, to be known as Wycombe Aircraft Constructors, Ltd., whose operations are to be centred at Wycombe, Bucks.

One understands that Mr. G. Holt Thomas takes a controlling interest in the new concern. Mr. F. H. Payne, late of the Grahame-White Aviation Co., Ltd., has been appointed managing director, Mr. E. Ritchie, A.M.I.M.E., A.M.I.E.E, will be resident general manager, and Mr. T. Kemp Walton will be the resident secretary of the company.

The furniture making industry at Wycombe should be able to supply first-class labour for aircraft construction, and an important addition to the supply of aeroplanes will take place as soon as the new works are set going.

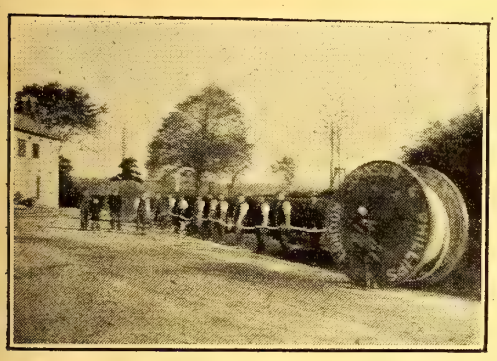




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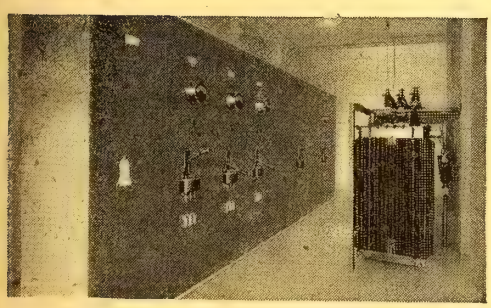
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NEWCASTLE-ON-TYNE, 44b, Blackett St. | PORTSMOUTH, Cleveland Rd., Gosport.

(Continued from page 950.)

WELCH.—Lt. Hugh Welch, R.F.A. and R.F.C., killed in an air fight on March 28th, was the eldest son of Thomas Hulme and Margaret Welch, Eltham, S.E.

WHITE.—Capt. Lewis Scott White, M.C., who was killed in a flying accident at Wantage on Sept. 28th, in his 22nd year, was the youngest son of Mr. Edmund White, M.B., of Green Park, Bath, and was educated at Victoria College, Grosvenor. He always took a keen interest in aviation, and was a prominent member of the Bath Aero Club. He entered the R.F.C. as a mechanic in October, 1914, and, receiving a commission, was gazetted Captain on May 5th last. It was only last Wednesday that he attended an Investiture at Buckingham Palace, and was decorated by the King with the M.C. For the last two months Capt. White had been Flight Commander of a flying squadron training at home, but was returning to the front in a few days.

It is stated that a new machine was being sent to an aerodrome, and the pilot having engine trouble descended near Wantage. Capt. White later arrived from the aerodrome and went up in the machine. Soon afterwards the aeroplane crashed to earth, and the officer died almost immediately after being extricated from the wreckage.

WHITTALL.—Sec. Lt. Noel Charles Whittall, Royal Fusiliers, attached R.F.C., who was killed on Sept. 13th, was the eldest son of Mr. and Mrs. F. J. Whittall, of 11, Torridon Road, Hither Green, S.E. Born in 1896, he was educated at Claremont House School, afterwards passing to St. Dunstan's College, which he left at the age of 17 to enter the works of Messrs. Elliott Brothers, Limited, electrical engineers, of Lewisham, remaining there until taking a commission in June, 1915. After seeing active service on the Western front for twelve months he transferred to the R.F.C., and came home last July to complete his training, leaving again for the front on August 14th last. Early this month in an air fight he encountered four enemy aeroplanes, and after firing 200 rounds of ammunition succeeded in bringing down a Hun machine and dispersing the remainder.

His squadron commander writes:—"He is one of the greatest losses that my squadron could have sustained. Although he had been with me such a short time I realised what an excellent fellow he was. His keenness reflected itself in his work, and he was getting on exceptionally well."

Marriages.

BOSTON—WOOD.—On Sept. 21st at Wolvercote Church, near Oxford, William Harold Boston, Sec. Lt., R.F.C. (late Suffolk Regt.), eldest surviving son of the late John Boston, of "St. Wyburn," Birkdale, was married to Lucy Maria, daughter of the late Dr. James Wood and of Mrs. Wood, Grove House, Southport, by the Rev. A. J. Carlyle, D.D.

HAWKSLEY—McCLEARY.—On Sept. 18th, at St. Osburg's, Coventry, Sec. Lieut. Gerald Eugene Hawksley, R.F.A., attd. R.F.C., elder son of the late Mr. and Mrs. Robert Paton Hawksley, of Nottingham, was married to Violet Mary, third daughter of Mr. and Mrs. W. J. S. McCleary, of Smarden, Kent.

HOUSDEN—PRITCHARD.—On Sept. 22nd, at the Baptist Chapel, Whitstable, Lieut. R. J. Housden, R.F.C., only son of the late Mr. J. A. J. Housden, late of the G.P.O., and Mrs. Housden, of 19, Compton Road, Canonbury, was married to Maud Elizabeth, elder daughter of Mr. and Mrs. George Pritchard, of Whitstable, by the Rev. J. Wallis Humphreys.

MORTON—BOWDEN.—On Sept. 22nd, at St. John's Church, West Ealing, Capt. Gerard Hume Morton, of Victoria, B.C., Canadian Infantry, attached R.F.C., son of Capt. A. W. Morton, Canadian A.S.C., was married to Norah, fifth daughter of the late Frank Meno Bowden, of Madras, and Mrs. Bowden, of 109, Uxbridge Road, Ealing, by the Rev. James Summerhayes.

SMART—IRWIN.—On the 26th inst., at St. Paul's Church, Kersal, Capt. C. D. Smart, M.C., R.F.C., second son of the late Arthur Smart, of Kersal, was married to Helena May, only daughter of Mr. and Mrs. Henry Irwin, of Chorlton-cum-Hardy, formerly of Melbourne, Australia, by the Rev. Reginald Petch, M.A.

YATES—TILDEN-SMITH.—On August 29th, Major H. T. F. Yates, M.C., R.F.C., was married to Yvonne, youngest daughter of R. Tilden-Smith and Mrs. Tilden-Smith.

Births.

BIRD.—On Sept. 23rd, at 13, Colville Mansions, Bayswater, W., to Clarice Rosalie, the wife of Sec. Lt. C. O. Bird, R.F.C., a son.

MACMASTER.—On Sept. 24th, 1917, at Tower House Nursing Home, Crouch Hill, N., the wife of Cadet R. E. G. Macmaster, R.F.C., of a daughter.

RODWELL.—On Sept. 23rd, at Lincoln, the wife of Major J. T. Rodwell, R.F.C.—a son.

WOOD.—On Sept. 24th, at Danes House, Aldeburgh, Suffolk, the wife of Capt. F. J. Wood, R.F.C. (and of the Indian Finance Dept.), of a daughter.

Mrs. Archibald I. Orr-Ewing has received news unofficially via Amsterdam that her husband, Sec. Lt. A. I. Orr-Ewing, Yeomanry, attached R.F.C. (officially reported missing on Sept. 20th), is unwounded and a prisoner of war in German hands.

* * *

If any officer or man can give any information, or if relatives of prisoners of war in Germany would ask for news of Sec. Lt. E. H. P. Streather, R.F.C., who was reported missing on Sept. 11th, the same would be gratefully received by Mr. Streather, of D'Arcy House, Finchley Road, Golder's Green, N.W.4.

* * *

News of Lieut. A. J. C. E. Phillippo, R.F.C., whose machine fell near Hollebeke, in the German lines, June 7th, will be gratefully received by his mother.—Box E.930, "The Times."

* * *

Mr. Bonar Law has been informed that his son, Captain J. R. Law, R.F.C., is missing.

Captain Law, who is the eldest son of the Chancellor of the Exchequer, joined the Royal Fusiliers at the outbreak of the war, and then transferred to the Royal Flying Corps, in which he has been serving for two years.

* * *

Lt. John Knight, R.F.C., grandson of the Rev. B. Knight, of Torquay, has succeeded in making his escape from Germany. He was compelled to descend behind the German lines in Flanders some time ago, and was captured. On the occasion of his first attempt to escape he remained free for three days, being discovered as he lay asleep beneath a heap of straw in a stable. The second attempt proved a complete fiasco, Mr. Knight being shot in the leg before he had got clear of the place of detention. Profiting by experience, the third attempt was successful, and he reached the frontier after ten days' thrilling adventures, which included the swimming of a wide river.

A special correspondent of the "Morning Post" writing on September 26th of the recent advance east of Ypres, says:—"The surveillance of his counter-attacks since last Thursday's advance has undoubtedly flurried the enemy. He has shifted troops in an unusually extravagant manner, altering their routes repeatedly to try to avoid our guns; but they have been followed from route to route and back again, and punished all the way.

"Of nine counter-attacks made on September 20th only three were able to get within rifle or machine-gun range. Those delivered yesterday were harassed by airmen, as well as the batteries. Our aeroplanes were thick over the enemy areas around Zandvoorde and Gheluvelt last night, and the whole were made hideous with every kind of bomb and shell.

"The German Staff apparently thought something of the kind was in store for them to-day, and the fighting in the air yesterday was unusually severe in consequence. Our 'low flyers' were up and down our lines from noon onwards, and others went further afield. The reports they brought back were convincing enough—in the language of one of my informants, 'the Huns had the jumps.'

"They had reason. The activity of our airmen alone is sufficient to keep their infantry in a state of nerves. The other night the raiders went out with flares and found the Menin road full of troops coming up to take part in the new counter-offensive. They made some thirty attacks with their bombs and machine-guns, lighting up the crowded highway 'like a circus,' and came back before dawn to say that they had had the time of their lives."

FRANCE.

Official Communiqués.

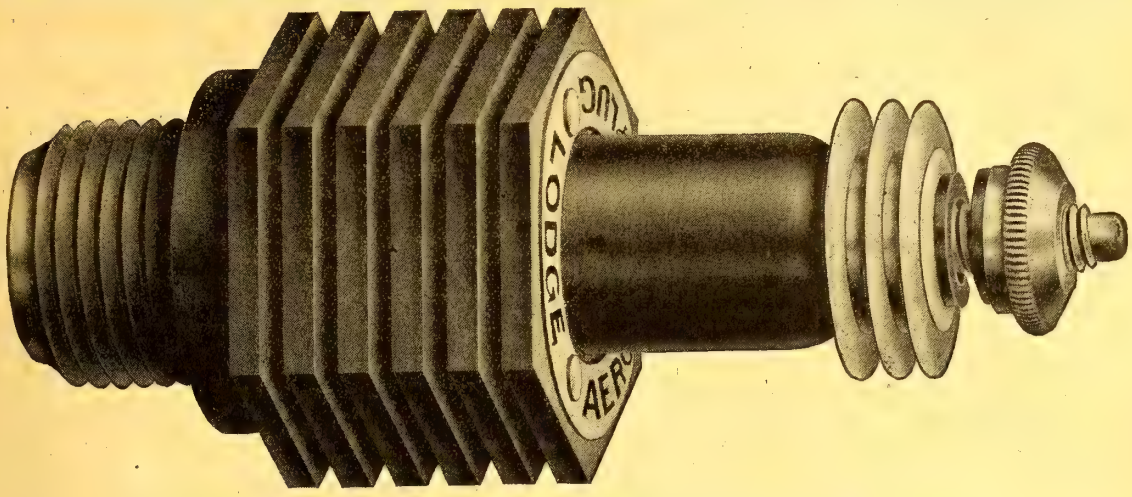
Sept. 25th.—Three German aeroplanes were brought down during the day yesterday by our pilots.

Our aeroplanes carried out various bombardment operations in the daytime yesterday and in the course of last night. Ten thousand kilograms (about 10 tons) of projectiles were dropped in the course of these expeditions, especially on the railway stations of Cambrai, Luxemburg, Longuyon, Brieulle, etc. Several fires broke out in the bombarded buildings.

Army of the Orient.—There was great activity by the artillery and aviators on both sides.

Sept. 26th.—On the 25th inst. two German machines were brought down after aerial fighting and two others were seriously damaged.

The railway stations of Roulers and of Lichtervelde, in Belgium, the hutments of Nantollois (north-west of Verdun), the



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stations Brieulles (north of Nantollois), Metz, Woippy (near Metz), etc., have been plentifully bombarded by our squadrons.

Army of the Orient.—British and Serbian aviators successfully bombarded enemy cantonments in the neighbourhood of Demirhissar (Struma front), Doiran, and Nonte (west of the Vardar).

Sept. 27th.—Army of the Orient.—British aviators bombarded the enemy encampments in the region of Doiran.

Sept. 28th.—In spite of unfavourable atmospheric conditions our bombarding squadrons during the night abundantly showered with bombs the aviation grounds of Marville (south-east of Montmédy) and Mars la Tour (west of Metz), the railway stations of Brieulles (north-west of Verdun), Fléville (west-south-west of Brieulles), and Romagne sous les Côtes (north-north-east of Verdun), and the cantonments of Peuvillers and Sivry-sur-Meuse (north and north-west of Verdun respectively). All the objectives were attained.

Sept. 29th.—German aeroplanes bombarded the region of Bar-le-Duc.

On Sept. 27th two German aeroplanes were brought down by our fire. During the night of the 27th our squadrons bombarded the aviation grounds at Staden, Roulers, and Cortemarck, and the camps in the vicinity.

Sept. 30th—Some German aeroplanes bombarded the region of Dunkirk on the 27th, 28th, and 29th. The two first bombardments only caused material damage.

The last, which was particularly violent, resulted in the death of several civilians.

Two German machines were brought down by our pilots during the day of the 29th.

During the night of the 28th the railway station of Colmar and the enemy establishments to the north of Soissons were visited by our aeroplanes. Four tons of bombs were dropped with success.

Oct. 1st.—The enemy's aircraft last night bombarded the region of Bar-le-Duc, inflicting material damage and causing several casualties.

During the day yesterday five German aeroplanes were brought down in air fights, and seven other enemy machines fell out of control into their own lines.

Our bombarding squadrons dropped bombs on the railway station and cantonments of Fresnoy-le-Grand, where violent fires were seen to break out, on the railway stations of Thionville, Mezières, and Dieuze, and on the works of Hagondange.

As a reprisal for the bombardments carried out by the Germans against the open town of Bar-le-Duc, two of our aeroplanes last night dropped three hundred kilograms of bombs on the fortified city of Stuttgart.

In Belgium we bombarded the aerodromes in the Roulers and Thielt regions, the railway stations of Lichtervelde, Staden, Cortemarck, etc.

It was reported from Paris on Sept. 25th that Captain Guynemer is missing. He started on a reconnaissance over the Flanders front on the morning of Sept. 11th, and became separated from the comrade with whom he was patrolling while chasing some enemy aeroplanes. He has not been seen since. Every possible means of throwing light on his fate had been tried without result.

Captain Guynemer was the champion "ace" of the French Army. He had brought down fifty-three German machines. One of the most characteristic of his recent feats was to force a German aviator to land and surrender behind the French lines, although Guynemer had not a single cartridge left. He accomplished the feat by sheer mastery of flying and terrorising his enemy. Captain Guynemer flew over and under the German machine, heedless of the German aviator's bullets, and forced him to drop to a lower level, completed the circle, and then passed over the German machine again. He repeated the performance until the amazed German gave up and landed. The whole time he expected to be riddled with bullets as Guynemer passed him. The German never suspected until he was told that the reason his adversary did not fire his machine gun was that he had not a cartridge left.

Another of Guynemer's feats was having his photograph taken while attacking a German machine. He and another pilot went up together and found a Hun, whereupon Guynemer assumed his favourite position of attack, while the other pilot flew wide and photographed the two other machines, with Guynemer a few feet from the Hun's tail. When the photographs were taken he signalled to Guynemer, who promptly shot the Hun.

Guynemer, despite all his promotions and decorations, was one of the quietest and most modest of men, and quite unlike a "star" of any kind. Consequently he was immensely popular with everybody who knew him. He has been badly wounded at least twice; on one occasion, it is said, when trying a new gun, with which he brought down two Germans in the first two shots, and which blew out its breech-block in his face at the third shot.

Guynemer was born in Paris on Dec. 24th, 1895, and was a student at the Ecole Polytechnique when war broke out. He tried to join the Army, but was refused on account of delicate health. Finally he succeeded in entering the Aviation School at Pau as a pupil-mechanic. After a short training as a pilot, he left for the front on June 8th, 1915, to join the "Stork" squadron, in which he soon distinguished himself by his courage. A month after his arrival at the front he brought down his first enemy aeroplane. Recently he brought down in a single day his 51st, 52nd, and 53rd enemy aeroplane.

The "Journal" says:—Finally, on Sept. 11th last Guynemer started on a flying expedition at 10.30 a.m., and encountered a whole squadron of enemy chasing aeroplanes. He might have avoided a fight, but such a thing never entered his head. He made straight for the enemy and brought down two. He was, however, overwhelmed by numbers, and fell with his machine into the sea.

Other accounts say that he fell in the Forest of Houlthoulst. Some say he was seen attempting to land, and others that he fell out of his machine.

The correspondent of the "Cologne Gazette" (Sept. 28th) on the Western front says that, according to the "Gazette des Ardennes"—which is under German control—Capt. Guynemer was killed on September 11th about 800 yards east of the cemetery of Poelcapelle. A German serjeant found there a one-seated machine with a wing broken and the pilot dead from a bullet wound in the head, and on him an identity disc with the name, Georges Guynemer.

* * *

Writing on Sept. 27th an expert French commentator says:—

The British aviators during this fighting showed particular victorious activity. They used their machine-guns on marching troops from a low height, and bombed the enemy military organisations. The importance of aviation is emphasised in each new offensive. The German communiqué naturally shows a subtle discretion on the results obtained by our Allies, but it, nevertheless, partially confesses them.

* * *

From the "Times of Sept. 29th:—

During the past few days there have been disputes about wages in French aeroplane factories. An arbitration award, given on September 20th by the Permanent Committee of Conciliation and Arbitration of the Seine, has, however, been accepted by both parties. The further questions of wages for skilled female labour and for unskilled labour are to be settled without delay.

* * *

DONZE—MACKENZIE PENNY.—On Sept. 25th, at St. Joseph's Church, Newton Abbot, Robert Louis Donzé (Brigadier-Pilote, French Aviation Corps), youngest son of Mr. and Mrs. Donzé, of Santa Barbara, California, U.S.A., was married to Gladys Isabel Mackenzie, only daughter of the late Don Mariano and Mrs. Penny, of Aberdeenshire, N.B., by the Rev. Thomas Barney.

GERMANY.

Official Communiqués.

Sept. 25th.—Last night our aviators attacked England.

Bombs were dropped on military buildings and warehouses in the heart of London, on Dover, Southend, Chatham, and Sheerness. Fires gave evidence of the effect.

All our machines returned undamaged.

Dunkirk was also attacked with bombs.

Western Front.—The enemy lost 13 aeroplanes. First Lieut. Schleich won his 22nd and 23rd aerial victories, and Lieut. Wüsthoff his 21st.

Sept. 26th.—In the evening our aviators again attacked London and the English (sic) coastal towns on both sides of the Channel.

Bombs dropped on Ramsgate, Margate, Dover, as well as on Boulogne, Calais, Gravelines, and Dunkirk, were observed to have incendiary effect.

One of our aeroplanes did not return.

On land the enemy lost 15 aeroplanes yesterday. Ober Lieut. Berthold brought down his 24th adversary in aerial battle.

Sept. 27th.—Seventeen enemy aeroplanes were brought down yesterday.

The bombardment of Ostend in the night of September 25th-26th, apart from damage to buildings, demanded sacrifices also from the population. Fourteen Belgians were killed and twenty-five seriously wounded.

Sept. 28th.—As the result of successful battle flights during the last few days 1st Lt. Berthold brought down his 25th opponent, Lt. Wüsthoff his 22nd, and Lt. von Bülow his 21st. 1st Lt. Waldhausen yesterday succeeded in bringing down one aeroplane and two captive balloons.

Oct. 1st.—English and French aviators, by the dropping of bombs, recently wrought considerable material damage in Belgium territory, their attacks also causing numerous victims amongst the civil population.

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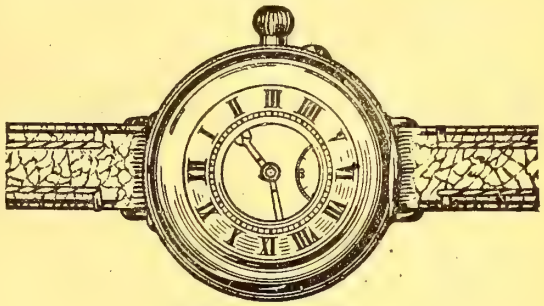
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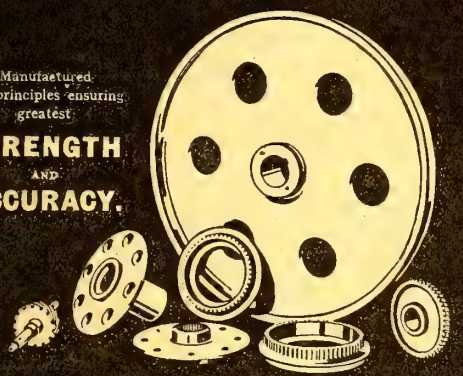
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ings and warehouses in inner London. Numerous fires showed this attack to be particularly effective.

"Other aeroplanes successfully attacked Margate and Dover.

"All our machines returned unharmed."

RUSSIA.

Official Communiqués.

Sept. 25th.—On September 22nd our aviators bombarded the enemy's stores in the region of the village Huta Borovenskaya (27 miles north-east of Kovel) and the small town Lubachevo, dropping about four poods (144 lb.) of bombs.

Sept. 26th.—Baltic Sea.—Since September 14th the enemy activity has become more intense, and has been chiefly characterised by aerial reconnaissances and submarine manœuvres, which are endeavouring to prevent our vessels approaching the Courland coast.

During the night of September 25th our coast of the Irben Channel was attacked by Zeppelins. During two raids nearly 40 bombs were dropped.

Sept. 27th.—On Sept. 25th the enemy made several aerial raids in the region of the Gulf of Riga, with the object of ascertaining the exact position of our naval forces. The enemy aeroplanes kept themselves beyond the reach of our naval guns and coast batteries.

Sept. 28th.—Our aviators dropped bombs on the Turkish camps to the west of Kalkit and on Kemon. In the last place explosions were observed.

Sept. 29th.—On Sept. 26th, in the Tarnapol region, our aviators brought down two enemy machines, which fell into the enemy lines. In the Husiatyn reigon our aviator Lieutenant Okennen brought down an enemy machine, which also fell into the enemy lines. In this region our aviators Ensigns Kirsanoff and Leman brought down an enemy machine, but in this combat the machine of Ensign Kirsanoff was damaged and fell into the enemy lines.

In the Focsani region the Rumanian aviator Lieutenant Dragetchano brought down an enemy machine whilst over the enemy lines.

Sept. 30th.—Near the village of Ohlenorovka, a German aeroplane was brought down by one of our "Murometz" machines. On the same front one of our aviators, Lieutenant Dobrukhotoff, brought down an enemy aeroplane, which fell in flames.

On September 23rd, in the region of Husiatyn (Russo-Galician Border) our pilot Ensign Iantchenko forced down an enemy aeroplane. In the same region our pilots Captain Kozakoff and non-commissioned officer Chirinski attacked four enemy aeroplanes. One of them was brought down by Chirinski, but the machine of the latter was in its turn damaged and put out of action. Captain Kozakoff continued the fight alone and forced the enemy to land in his own lines.

In the Baranovitchi region north of the railway, near the village of Polonetchka, an enemy aeroplane set on fire with burning liquid one of our captive balloons. The observer descended by means of a parachute.

In the region of the mouth of the Danube, north-east of the town of Kilia, an enemy aeroplane was captured. Its occupants —an officer and a private—were taken prisoners.

Oct. 1st.—On September 28, in the region of Kowel our aviators dropped on the enemy camps about 7 cwt. of bombs, and in the Buczacz region our giant aeroplanes of the Murometz type dropped about 2 cwt. of bombs. (!)

Supplementary reports establish the fact that N.C.O. Aviator Sapozhnikoff shot down an enemy machine in the village of Vollovetz, south-west of Radautz.

ITALY.

Official Communiqués

Sept. 25th.—During the day four tons of high-explosive bombs dropped by our aviators caused destruction and conflagrations in the railway establishments and stations of Podiberga (Podberdo) (Bazza Valley) and Rifemberga (Reifenberg) (Carso). In the night one of our airships surprised in the Chiapovano Valley (north-east of Gorizia) intense movements of troops and motor-lorry columns and dispersed them with a ton of projectiles.

Sept. 26th.—In the morning our aeroplanes bombarded the railway establishments of Podberdo (Bazza Valley), and in the afternoon those of Prosecco (coastal line). Altogether five tons of bombs were dropped, with results visibly effective.

Sept. 27th.—The railway plants at Grahovo (Bazza Valley, 20 miles north-east of Gorizia) and Dottogliano (Dutovlje, eight miles north-north-east of Trieste) were yesterday the object of attack on the part of our air squadrons, which dropped altogether five tons of bombs. The enemy reaction was very lively. One of our machines is missing. An enemy machine brought down in an aerial combat over Asiago fell in flames in our lines.

Sept. 28th.—Yesterday our aviators, persevering in the intention of interrupting the railway traffic in Bazza Valley (north of Gorizia), caused great destruction to the railway plant at Podberdo.

Last night one of our bombardment squadrons consisting of numerous machines, notwithstanding the heavy mist, reached the fortified maritime centre Pola and effectively bombarded the Arsenal and the submarine base at the Olivi Rock (the naval dockyards) with over three tons of high explosive shells.

On the evening of the 26th inst. enemy machines flew on the Lower Isonzo and bombed some inhabited centres without doing damage or causing casualties.

Sept. 29th.—Our air attacks were concentrated on the military zone of Voiscizza (Carso), which was effectively bombarded with about three tons of bombs, and on the fortified maritime centre of Pola, where the submarine base and the arsenal were again bombed with numerous projectiles by a strong bombardment squadron.

An enemy machine was forced to land in the plain of S. Lucia (Tolmino), where it was subsequently destroyed by our artillery. Last night hostile aircraft dropped incendiary bombs on the town of Palmanova; very slight damage and no casualties.

On Sept. 29th Serjt. Stoppani, on a Savoia Verduzio chaser aeroplane, flew from Turin to Rome, a distance of over 375 miles, in two hours and 50 minutes. The average speed was 137½ miles an hour. A strong wind was blowing.

Sept. 30th.—Air fighting was very brisk along the whole Julian Front. Our air squadrons yesterday bombarded the enemy depôts at Berje (north-east of Nabresina) (Gulf of Trieste) and last night the known military works of the fortress of Pola with excellent results. The reaction of the enemy was vigorous everywhere. One of our machines did not return to its base. Two enemy aeroplanes brought down in aerial combat fell in the neighbourhood of Montfalcone and east of Ternova.

Oct. 1st.—During the night of the 29-30 ult. hostile aircraft dropped bombs on Palmanova, Aquileja, Monfalcone, and other localities of the Lower Isonzo without doing material damage. One woman was killed.

* * *

On Sept. 26th Austrian seaplanes bombarded Grado, Gulf of Trieste, and killed several civilians, chiefly women, says an Exchange telegram from Rome.

TURKEY.

Official Communiqués.

Sept. 23rd.—In an aerial fight with two enemy aeroplanes, one of our machines put one enemy machine to flight and compelled the other to descend behind the enemy's lines.

Sept. 27th.—Tigris Front.—Two enemy aeroplanes which flew over our lines on the morning of September 24th were attacked by one of our aeroplanes piloted by Proby. Flt. Officer Reyner, who forced these two British machines to land in our lines. The pilots and observers of these machines—four unwounded British aviators—were made prisoners.

Sept. 28th.—On the 27th a cruiser, accompanied by a patrol vessel and a seaplane motor ship, appeared off the port of Beirut. While the cruiser bombarded the open town two seaplanes also dropped bombs on the town.

BELGIUM.

Official Communiqué.

Sept. 27th.—To-day our aviation service performed its duties as usual.

* * *

The military correspondent of the "Temps" on the British front writes on Sept. 26th:—

"The statements of captured German aviators are full of interest. The aerodrome at Ghistelles (south of Ostend) is now being disbanded because its personnel, which is bombarded incessantly day and night, will not remain there any longer."

DENMARK.

It was reported that Danish aeronautical circles have decided to co-operate in the regular Scandinavian aerial service, which will be instituted after the war.

SWEDEN.

A Nieuwediep motor-boat on Sept. 26th brought in a British seaplane adrift off the Dutch coast through lack of petrol. Its occupants were taken on board a guard vessel, pending internment decision.

HOLLAND.

A message from Amsterdam on September 26th states that two German seaplanes have been shelled down near Flushing by a Dutch torpedo-boat. The four aviators who manned them, including one injured, have been interned.

A Reuter message adds that one of the seaplanes was of a new type, and quotes the newspaper "Telegraaf" as reporting that whilst one of the seaplanes was shot down by a Dutch

TERRY

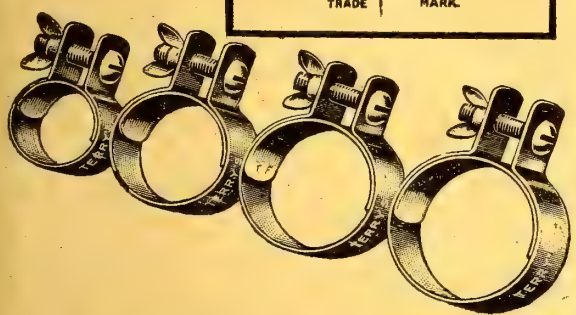
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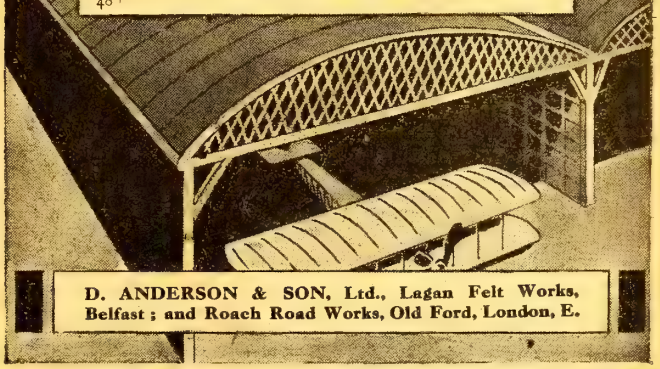
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torpedo-boat, the other had previously descended near Cadzand. The one which was shot down was flying very close to the torpedo-boat, and refused to surrender when summoned to do so. The torpedo-boat thereupon fired, wounding one of the occupants, both of whom then surrendered. The "Telegraaf" adds that about half a dozen German aeroplanes appear to have been flying over Dutch territory at the time.

The "Handelsblad" reports that a French seaplane, manned by an officer and a sailor, was brought into Nieuwediep on September 26th. The seaplane was forced to come down through lack of petrol off the Haaks Lightship, where it was picked up.

* * *

The two British aviators who were landed in Holland on Sept. 25th by a Dutch fishing vessel after they had been obliged to come down on the open sea have been set at liberty, but their machine has been seized by the Dutch authorities.

* * *

A telegram from Sluiskil states that on Sept. 29th a German aeroplane of the newest type, G.O.G.4 No. 602/16, descended near Sas van Gent. One of the three occupants was severely wounded. The machine was armed with three machine-guns, and had six bombs on board. The unwounded occupants attempted to escape to the frontier, but were caught. All three will be interned.

A telegram from Sas van Gent says that the aeroplane came from a raid on England. A map of Southern England, including London, and maps of Zeeland, Flanders, and the Belgian coast were also found in the aeroplane.

* * *

The "Telegraaf" learns from Zevenaar that a German aeroplane appeared on Sept. 27th over Doornenburg. It was fired on from a fort near Pannerden, and was obliged to descend, but it managed to go up again, and disappeared before it could be captured.

THE INVASIONS OF ENGLAND.

The Commissioner of Police draws attention to the new Lights Order which came into force on Monday. Its provisions are substantially the same as in previous orders, but the revised times, from which, until one hour before sunrise, blinds are to remain drawn, are given below :—

October 1st to 15th	6.30 p.m.
Oct. 16th to 31st	6.0 p.m.
November 1st to November 15th	5.30 p.m.
November 16th to January 31st	6.0 p.m.
February	6.30 p.m.
March	7.30 p.m.
April	8.30 p.m.

According to Greenwich mean time in each case.

* * *

A meeting of the Committee on War Damage was held at the Mansion House on Sept. 28th, the Lord Mayor in the chair.

The Lord Mayor reported that the Sub-Committee, consisting of himself, Lord Parmoor, and Mr. Mark Judge, had been in communication with Mr. Lloyd George's private secretary, but so far the Prime Minister had been too busy to deal further with the question of Government compensation for damage caused by air raids and bombardments.

A resolution was passed agreeing that the pronouncement made by Mr. Lloyd George on July 14th offered a satisfactory solution, and the Committee of three was requested to meet forthwith the body authorised by the Government, in order that a practical scheme might be formulated without delay

* * *

The following is from the "Times" of Sept. 27th :—

The crowding of the Tubes long before the issue of any warning or any indication of attack, is also engaging the serious attention of the authorities. Great numbers of the alien population of the East-End, many men of military age, have taken to camping with their families three deep on the Tube platforms as early as 5 o'clock in the afternoon. Later arrivals are crowded to the edges, whence any movement, from panic or crowding would thrust them on to the live rail. Serious accidents of this kind were only avoided at certain stations in the Hampstead district by strenuous exertions on the part of the special constables. At some points, the campers refused to budge when informed that all was clear, and, crowding round the lifts and emergency staircases, delayed the egress of others for nearly an hour. Last night they were camped in large numbers on all the Tube stations from Charing Cross to Hampstead as early as 5.30, and at 7 o'clock there was scarcely room for passengers to pass to and from the trains. The majority of these people come from the East, where it is pointed out there is safe accommodation for 20 times the number of people who flock to the Tubes.

Complaint is made of the filthy condition and habits of these people and their migrations seriously threaten the health of the invaded districts. [Their germs are worse than the Germans. One also notices that many of the refugees fill up their time with "joy-rides" up and down the line to the discomfort and annoyance of bona-fide passengers.—Ed.]

* * *

A London Coroner held an inquest on Sept. 26th on the bodies of two men who were killed on Sept. 24th. The victims were Patrick Kennedy, aged 23, a native of Wcoloomaloo, New South Wales, and Peter Ryan, 29, of Clifton, Bristol.

Inspector Arthur White, of the London Police, gave evidence of the warning being given, and said that ample opportunity was given to those in the streets to take cover. The dead men, with many others, remained in the street. The bomb fell outside an hotel, doing considerable damage. Twelve people were fatally injured.

The Coroner: "How many were injured?"—"About 18. The bomb fell about 12 ft. from the hotel entrance."

The Coroner: "Thirty people altogether—12 killed and 18 injured, all in the street. There's a useful lesson to be drawn from that." He added that as all the people who were killed or injured were in the street, it emphasised the necessity of taking cover or stopping indoors directly one heard gunfire. People who continued to walk about or stood in doorways or gazed up at the sky were seeking trouble. No one would deny admission to pedestrians at a time like this, and in this locality there were any number of hotels.

* * *

In view of the German admission that one of their aeroplanes had not returned from the raid of Sept. 25th it is interesting to note that a Gotha was reported to be so badly damaged by gunfire from an Essex district, as it was making its escape seawards, that petrol fell in large quantities over a wide area in the eastern part of a town. And this despite the fact that even water would disperse in a few hundred feet. German war petrol cannot be so unevaporable as all that.

WAR WORK FOR WOMEN.

A thousand women are wanted at once to train for engineering and other advanced forms of work in the munition factories.

The Training Section of the Ministry of Munitions is providing free instruction in machine work (general and more advanced), oxy-acetylene welding, aeroplane-woodwork, optical instrument work, draughtsmanship, electrical work, and core making.

Instructional workshops have been set up in London, Birmingham, Bristol, Luton, and Manchester, and other training centres have been established in twelve metropolitan areas and in twenty-four country districts, as well as in four centres in Scotland.

An appeal is made to women of good physique, and between the age of 18 and 35, to offer themselves at once for training. Such women are to be found in every class of society, and they are asked to apply to the Director, Training Section, Ministry of Munitions, 6, Whitehall Gardens, S.W.1.

THE LORD MAYOR'S LETTER.

Among the letters brought by Captain Laureati on his flight from Turin to London was one addressed to the Lord Mayor by Signor Agnelli, the managing director of the F.I.A.T. Company, of Turin, which said :—

"For the first time an Italian machine, built by the F.I.A.T., has flown from Italy to England, establishing, through the great highways of the sky, new ties to add to those which already on the fields of battle unite our two peoples in the holiest alliance. To you, my Lord Mayor—the first citizen of the great metropolis—ay arrive, over the peaks of the Alps and the valorous land of France, my respectful salutations and the most fervent wish for the victory of the brave soldiers of the Allies."

The Lord Mayor, in his reply, said he trusted that Captain Laureati's great flight might only be the forerunner of many simliar aerial enterprisee which might hasten victory.

SIR GEORGE WHITE'S WILL.

Probate of the will of the late Sir George White, Bt., managing director of the British and Colonial Aeroplane Co., Ltd., has been granted to his son, Sir G. Stanley White.

The will provides for the division of all the unsettled property between the late baronet's son and daughter, Mrs. Ernest J. Hudson. Probate has been taken out on a gross sum, exclusive of the value of property settled or transferred in the lifetime of the late baronet, of £185,000, with net personality of £137,000.

PRESENTATION AEROPLANES.

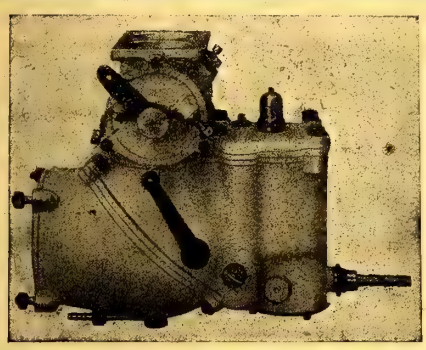
The Secretary of State for the Colonies announces that the High Commissioner for South Africa reports the contribution of a further sum of £10,000 to war funds by the Paramount Chief and the Basuto nation.

His Majesty the King has expressed his high appreciation of this gift, which is being used for the purchase of aeroplanes.

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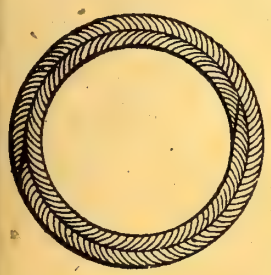
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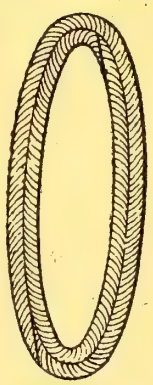
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MILITARY AERONAUTICS IN SWITZERLAND.

(The following article was published by the "Bulletin de l'Aéro-Club Suisse" as a reprint from the "Deutsche Luftfahrer Zeitung." It incidentally proves that nowadays even neutrals have to rely upon foreign publications for keeping posted on developments at home.—TRANSLATOR.)

Thus far, little information has reached the world regarding the organisation of Swiss military aeronautics. Of late, however, the Swiss General Staff's Press Bureau has published a memorandum dealing with the development of aeronautics in the belligerent countries, and referring also to the present status of aeronautics in Switzerland. Regarding the latter it says in part:—

"The war-born evolution of aircraft cannot but force us to greatly increase our aerial establishment if we want to remain efficient in this field, too. Here it is necessary to consider that, unlike the Great Powers, who can keep large aircraft factories working even in time of peace, Switzerland does not possess a real aircraft industry.

"Therefore, if we succeeded to build during the war aircraft of our own, it is chiefly due to the fact that our mobilisation recalled a number of engineers who were previously working in foreign countries. The construction of aero-engines, which is of a more exacting nature than that of ordinary petrol engines, has also been successfully undertaken; likewise, the training of pilots, which formerly was entirely dependent on foreign schools, is now satisfactorily done at home.

"Such is, then, briefly the development of national military aeronautics. If some think that the progress realised was not rapid enough, one should keep in mind the great technical difficulties and the corresponding expense of creating and developing this new arm. The Swiss people have—just like their neighbours—generously contributed to the national subscription for military aeronautics in order to enable the Army to increase their aerial establishment. But this purpose cannot be achieved if the military expenditure will not brace it in a marked degree, for there is still a long way before such degree of perfection can be attained, as is required by our military readiness."

This report permits to assume that the fund of the national subscription is nearly exhausted, as a consequence of which the Confederacy will undoubtedly authorise a considerable expenditure for military aviation. For it is generally understood that Switzerland does not intend to build airships, as their cost would be too great for so small a country. It is, however, proposed to enlarge the kite-balloon branch of the Army, since these craft have proven highly valuable in the great war as fire-control stations.

* * *

Thanks to the successful construction of national aeroplanes, the Swiss Flying Corps has now become a reality. Some time ago a squadron of 10 aeroplanes could be seen over Zurich, whither it had flown from the Confederate Air Station of Dübendorf. The first of a series of air bases (*points d'appui aérien*), which will be established in the near future, has now been created at Aarau, and Lt. Bider, the famous cross-Alps aviator, has been made the first Army Aviation Instructor. In order to prevent accidental violations of neutrality, Swiss aviators are under orders not to trespass the following zone:—Yverdon—Lake of Neufchâtel—Bienne (Biel)—Soleure (Solothurn)—Aar—Lägern—Rorbas—Winterthur—St. Gall—Reichenau—Tödi—St. Gotthard—Berne Alps—Rochers de Naye—Yverdon.

* * *

The war has influenced the situation of Swiss aviators in various ways. The Aero Club had certificated by October, 1916, 61 pilot-aviators; 12 of these lost their lives accidentally, and about as many gave up their profession before the war. Of the latter are Bianchi, Bucher, Gsell, Maffei, Salvioni, Schumacher, and Taddeoli. Nine aviators, namely, Audemars, Bider, Burri, Comte, Cuendet, Durafour, Grandjean, Lugrin, and Parmelin, offered their services to the Army, and are, though mobilised, kept on the reserve list. This enables them to look after their business; thus it was that Audemars broke the world's height record last year in France. Durafour is engaged at Buc, and Burri is with the Franco-British Aviation Cie.

Among the Swiss who are not Service-bound, Domenjoz is on an exhibition tour in South America. (He has lately gone to the United States.—TRANSLATOR.) Favre is chief-pilot of the Levasseur Works, and E. Baumann runs an aviation school at Hendon. The youngest Swiss aviator, the 19-year old Pasche, is testing, apparently with little success, an aeroplane of his own design, at Lavaux. Parmelin is in Geneva, and had to refuse advantageous offers from Russia and England, because the military authorities would not let him leave the country.

Among the Swiss aviators serving with the French *Aviation Militaire* Blancpain fell on the field of honour.

To his name should be added that of Sergeant Téophile Ingold, of Escadrille N. 23, who died of injuries received during a reconnaissance. He was recipient of a *citation à l'ordre de l'armée* and was proposed for the *Médaille militaire*; he was a cousin of Karl Ingold, serving with the German Flying Corps.—TRANSLATOR.

RESPONSIBILITY.

From the "Morning Post" of Sept. 20th:—

Sir,—I am an official working under the War Office, not under Munitions, but the gibes at "departmental tanglefoot" are being continually made at W.O. administration, and apparently produce no good result. They will not produce any result until the "causa causans" is removed.

And this cause—what is it? Money. How—waste? No; saving. The bed-rock trouble is the unwillingness of the people at the top to rely on the honesty of their subordinates. It is simply impossible for the senior Treasury official, whose concurrence would be necessary for any fundamental alteration in the methods of safeguarding the public purse, to give complete discretion to any lower official.

There is no parallel whatever to be found in what is called business—i.e., private enterprise as distinguished from Government service. The general manager of a railway company can, for example, allow a person to use a train in an emergency without paying for it. He is a trusted official, and whatever he did he would be backed up by his directors. Not so the public servant. Regulations are drawn up by the supreme authority, and practically no discretion at all is allowed to those who have to administer them.

It is no use girding at officials for being timid and being bound by red tape. I have a great deal of financial administrative work. My salary is £500 a year, and I am a married man. Do you think I am going to risk passing a claim of £3 or £4 when I know that if, on examination, it is found to come within the letter of the law I shall have to pay up that £3 or £4?

What I shall do is one of four things—either turn it down at once, or pass it to a subordinate to hunt up precedents, parallels, or previous decisions, or pass it to a colleague for his opinion, or pass it up to my superior for him to deal with.

If I turn it down, the claimant (and the public) call me stingy; if I follow either of the three other courses, the immediate consequence is delay, typing, writing, indexing, reading, talking, thinking, discussing, agreeing, disagreeing—in short, "bureaucratic incompetence." The cases that come up to me are the vexed ones, and it is precisely then that I should find more *power* so useful. But no; our theory of government is that I am not to be trusted.

A case occurred recently of a British serjeant travelling by train on duty in North China. For certain reasons it was impossible for him to travel third class, so he went first. The Regulations only allow a serjeant to travel third. All the power in the hands of our General Officer Commanding the China station was unavailing to sanction this extra expenditure. None but the Lords Commissioners of the Treasury were competent to do so.—Yours, etc., CALAMUS.

Sept. 19th.

A LESSON WANTED.

It might be well if someone of superior rank and intellect would give a few lessons in flying to the young gentlemen in the R.F.C. who visited Henley on a mono-avro on Sunday last about 12.30 p.m. He should at least be taught to handle his engine properly before he is let out alone. He first appeared as a sound only, fairly high up, then after a silence of several minutes he appeared at something like 1,000 feet, making frantic efforts to get his engine to start. Fortunately for him, it picked up at about 300 feet, and by the time he was down to 200 or so it was firing properly again. Having found his engine he proceeded to fly up the river from Henley to Marsh Lock, just level with the tops of the trees, and well away from any possible landing-place in case of engine failure. Thereafter he proceeded to do some rather crude turns over the town, finally landed on the golf course, and went to the Red Lion for lunch. His exhibition was not in the least pretty to watch, as his flying was quite of an elementary nature. All he did, in fact, was to endanger the King's property by flying absurdly low, and to annoy sundry perfectly peaceful persons with his antics.

C. G. G.

ROYAL FLYING CORPS CASUALTIES.

Under the title "Royal Flying Corps" a handbook has been compiled by Captain G. L. Campbell, R.F.A., T.F. Res. of Officers, assisted by Mr. R. H. Blinkhorn, which contains in tabular form the casualties and honours won by the R.F.C. during the period of the war brought up to July, 1917.

In the preface the compiler points out that many mistakes and omissions occur, and invites anyone who notices anything wrong therein to communicate with him at the publishers.

The paper cover edition costs 1s. 6d., and a cloth cover edition 3s. The book is published by the Picture Advertising Co., Ltd., and can be obtained from the Wm. Dawson Publishing Co., Ltd., Rolls House, Breams Buildings, E.C.4. Threepence extra per copy should be added to mail orders for postage.

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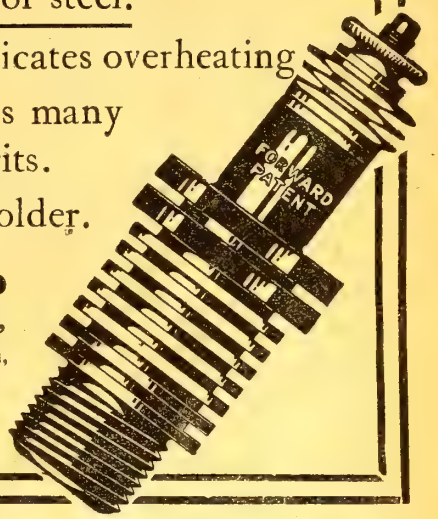
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AN EXHIBITION OF WAR WORK.

An important official exhibition was opened on Wednesday, Sept. 26th, at the Mappin Art Gallery, Sheffield, where samples of women's work, in connection with munition making, together with photographs of the different processes, are on view.

The exhibition is under the ægis of the Labour Supply Department of the Ministry of Munitions, and, as three sections are devoted to aircraft work, those interested in the manufacture of aeroplanes, engines and their parts, in the Sheffield district, are strongly recommended to pay a visit.

In the engine section are photographs and specimens illustrating the various operations entailed in the manufacture of parts of Clerget, R.A.F., Beardmore, Gnôme, and le Rhône engines, details being given of the nature of the tool or tools employed, the limits of tolerance allowed, the time taken to perform the operations, and the manner of setting up the tools.

In a similar way, sections of the exhibition are devoted to aircraft fittings (metal), and to aircraft woodwork, and samples are shown both of tinclips and wood members, many of which are made completely by women, and under female supervision.

The exhibition will be open until October 9th, and it is hoped that it will be well attended, not only by woman munition workers and prospective workers, but by the employers of labour who are still sceptical as to delegating important and accurate work to woman workers.

RED CROSS AEROPLANES.

Mr. A. J. Greenwall, writing in the "Daily Express" from Paris on Sept. 27th, says:—

Dr. Chassaing, who represents Puy-de-Dôme in the Chamber of Deputies, interviewed by 'Exclesior,' says that in most cases the quickness of first-aid is a question of life or death to the wounded. "Men who are wounded in the abdomen must be attended to at once, and no matter how perfect the sanitary organisation may be, it cannot overcome the congestion of the roads, which sometimes means that the ambulance wagons have to wait hours before they can leave the front lines.

"In the air there are no obstacles. Therefore, I have adapted an army type of aeroplane. I had two stretchers installed, and the results of the first trial, which took place at the Villacoublay aerodrome last week, exceeded my expectations. I occupied one stretcher and a soldier occupied the other. We flew about 15½ miles in 12 minutes, which represents a speed of about 80 miles an hour, and during the flight we did not feel the slightest inconvenience; the equilibrium of the aeroplane was perfect."

Dr. Chassaing believes that many thousands of lives may be saved by aerial transportation, and he suggests that the machines shall have red crosses painted on the wings and fly at a low altitude.

[This was a favourite idea of the late Mr. S. F. Cody.—Ed.]

"THE AEROPLANE SPEAKS."

The fourth edition of that invaluable work, "The Aeroplane Speaks," is now on sale, and its author, Captain H. Barber, R.F.C., is heartily to be congratulated upon a book so popular as to attain its fourth edition in little more than half a year.

For the benefit of those who have not had an opportunity of reading earlier reviews, it may be pointed out that "The Aeroplane Speaks" presents the whole theory and practice of flying in an entirely new manner, which may readily be understood by the layman, but in which the accomplished pilot will also find charm.

Industrial conditions may make it impossible to produce a further edition during the period of the war, and readers are, therefore, recommended to order copies early.

Copies may be obtained from the Wm. Dawson Publishing Co., Ltd., Rolls House, Breams Buildings, E.C.4. Price, 7s. 3d., post free.

THE OVERSEAS CLUB.

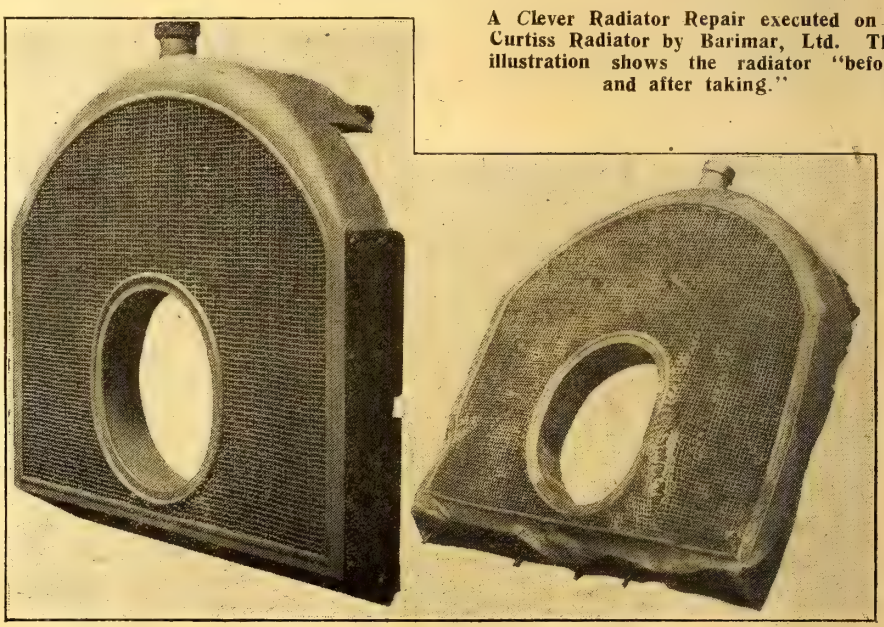
In less than six months the Over-Seas Club has collected more than £13,000 for the two Royal Flying Corps hospitals which have recently been opened—one in Eaton Square and one in Bryanston Square. The members have already contributed just on £500,000 for war purposes.

In a letter of thanks Sir David Henderson, Commanding the Royal Flying Corps, writes:—

"The Over-Seas Club has a strong link with the R.F.C., as we have already to thank its members for the presentation of over 100 aeroplanes; while, as you know, nearly 1,000 Britons from over-seas hold commissions in the Corps. In the near future we hope to open an up-to-date convalescent home, if possible by the sea, where our officers will be able to regain strength under ideal conditions. I hope, therefore, that we may count on your continued help. I cannot close this letter without a few words of special appreciation of your little monthly magazine, 'Overseas,' which has been so largely instrumental in making the appeal so successful."

A BARIMAR REPAIR.

One of the outstanding features of the war has been the extraordinary degree of perfection to which surgery of all kinds has been brought, and not the least interesting branch has been the repair of all kinds of mechanical appliances which would in ordinary times be consigned to the scrap heap. The illustrations show two views of a Curtiss aeroplane radiator before and after it has been treated by the Barimar Company's expert radiator repair. In the words of Mr. Brett, the managing director of the firm, that "not even the historic Sam Weller's double-million magnifying glasses" would enable the reader to discover in the larger illustration the spots where the original injuries were received.



A Clever Radiator Repair executed on a Curtiss Radiator by Barimar, Ltd. The illustration shows the radiator "before and after taking."

The Barimar firm are still able to undertake a certain amount of private work for persons concerned with occupations of national importance, and defective engine parts of all kinds should be sent to Barimar, Ltd., 10, Poland Street, Oxford Street, W.1, where similar treatment will be given to them.

A REPUDIATION.

The Whitehead Aircraft Co. have asked that no further publicity be given to an absurd paragraph which appeared in the "Daily Sketch" and the "Evening Standard" apropos a proposal to build a machine to fly the Atlantic next year. The paragraph was entirely unauthorised by the Whitehead Co., and the alleged facts were apparently communicated to the Press by an employee of the firm in the desire to obtain publicity.

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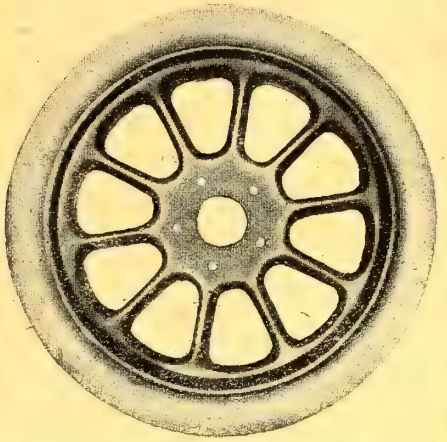
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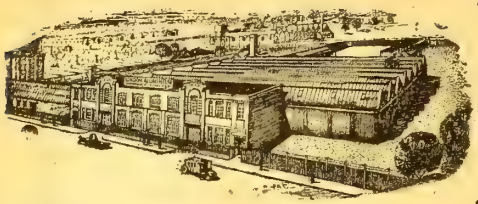
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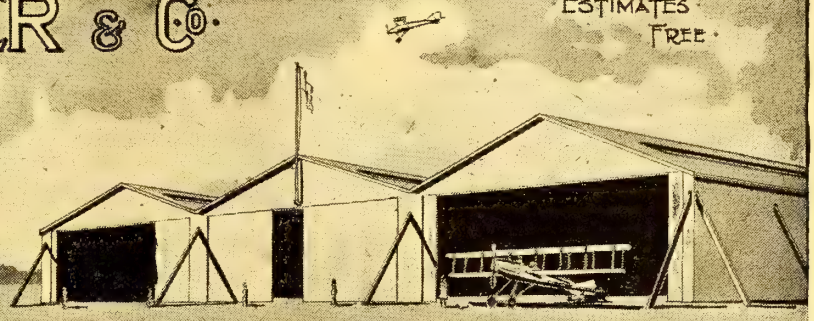
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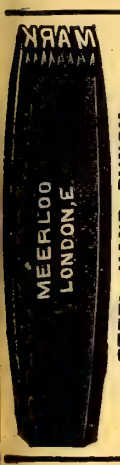
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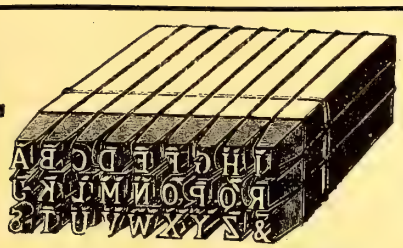
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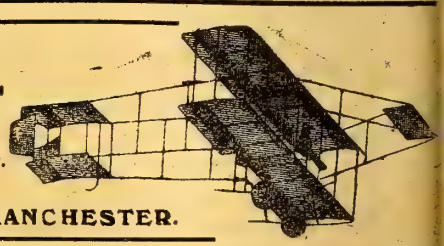
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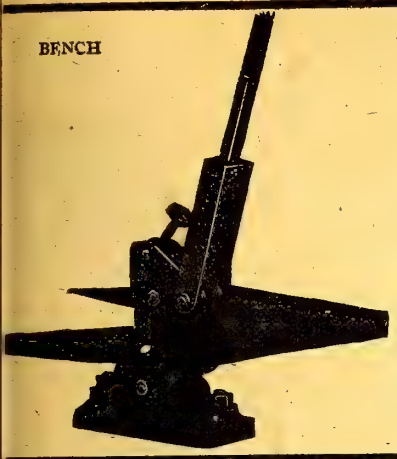
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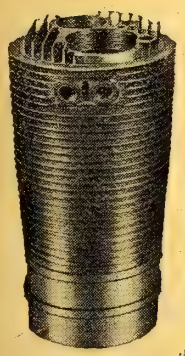
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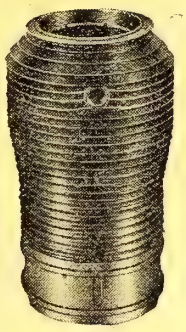


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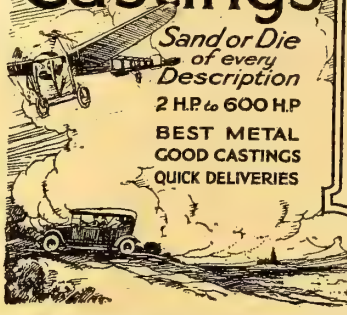
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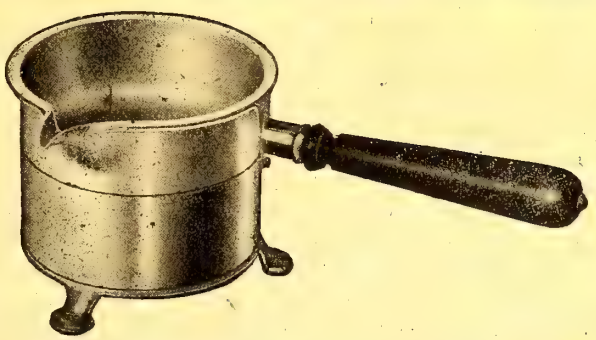
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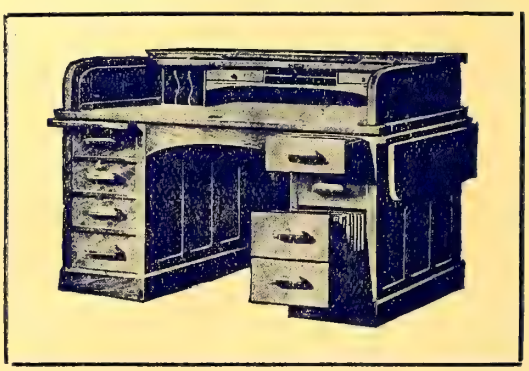
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ON GETTING OUR OWN BACK.

This past week may reasonably go down to history as "Reprisals Week." Everybody has been speechifying and writing and talking and shouting about reprisals. Personally I am all against agitation for reprisals, simply because it makes us look so ridiculous to be shouting for reprisals, when what has really happened is simply that the Germans have developed a special branch of warfare which we have neglected in a manner which can only be described as idiotic.

If I am not very much mistaken, the first bombs dropped on enemy territory in this war were dropped by R.N.A.S. pilots at Düsseldorf and Cologne, and after that at Friederichshafen, so we can, at any rate, claim that some of our people had the sense to see that bomb-dropping was worth while. One of our futile little bombs actually blew up a brand-new Zeppelin and its shed. Afterwards another airship shed and its contents were destroyed in Belgium, and two other Zeppelins were destroyed in the air by R.N.A.S. bombs from aeroplanes. And yet we never really took bomb-dropping seriously.

At first bombing was regarded rather as a kind of sport for young and energetic aviators, after the serious work of the day was done, or on an off day when the particular aviator was not down for reconnaissance or anything that mattered. Later on the bombing of railway and munition dumps in Hunland—which is Allied territory occupied by the enemy, as distinct from Germany proper—was tackled more or less seriously, but very unscientifically, for any old machines were used for the job, bombs were stuck outside them in the crudest of bomb-release gears, guaranteed to carry the minimum of bombs with the maximum of head resistance. And yet we had before us all the while that beautifully neat revolving bomb-carrier, built into the fuselage of the machine, designed by M. Coanda, of the Bristol Company, and exhibited at the Paris Aero Show of 1913.

Until quite recently, it was never worth the while of any designer to design a machine specially for bombing, because the authorities did not want it, in spite of the fact that we built the first specially designed bomber—as mentioned—and although the first little R.N.A.S. raids were successful. We even went to the trouble of sending a special bombing wing of the R.N.A.S. to Eastern France last year, equipped with machines "faked" for bombing, instead of designed for that job and no other. (Some day, after war, I hope to write the history of the wing.) And yet we are surprised when the German goes to the trouble of building as good a bombing machine as he knows how, and proceeds to use it for the purpose for which it was built.

M.Ps. and Generals and all sorts of people start agitating for reprisals when what they ought to do is ask those who have been responsible for the Flying Services in the past to explain why they have neglected their opportunities. Bomb Germany by all means, but let us bomb it in a proper spirit. The very word reprisal is enough to make one sick. A reprisal implies an act of righteous vengeance for wrong-doing, whereas what we want is to get our own back on the Germans because they had sense enough to hit us really hard before we had the sense to hit them. All our efforts hitherto have been merely enough to indicate to them how to begin to set about the job themselves.

The Solution of a Puzzle.

A good many people have been puzzled as to why the raids at the end of September were made so early in the evening, when in the ordinary course of events one would have expected them about midnight or after, so as to annoy people who have gone to bed. The reason cannot have been that the Hun, in a fit of generosity, desired to have the firing over in good time, so that people in London could get to bed at a reasonable hour. Nor can it have been altogether because the O.C. Hun Flying Corps in Flanders wanted himself to see his raiders return and did not want them to be kept up late—unless he is very different from British C.Os. of bombing squadrons in this respect.

When one comes to think it out, the reason is, after all, fairly simple. The Hun is, at any rate, a painstaking and scientific beast, and he has probably worked it out carefully that at this time of the year, on a calm night after a hot day, most of England is under a thick blanket of white mist. Therefore, if his raiders are to see their way and get a sight of their objectives, they must arrive early before the mist rises.

After midnight the mist becomes really thick, especially along the Thames Valley, and by the early morning it amounts to a fog, which, with the moon shining on top of it, would simply present a white sea to the raiders. Therefore it is essential that the raiders should arrive early in the evening. If anyone can think of a better reason, it would be interesting to hear it.

Incidentally one almost regrets the increase in consumption of gas for heating and the introduction of improved combustion fire-grates during the past thirty years or so, for the atmospheric condition of those recent raid nights would have been ideal for the production of a real pea-soup fog, which would have hidden London completely.

Thanks.

One may perhaps make use of this opportunity to point out the excellence of the work done by the organisers of the defences of London. It is obvious that one or two aeroplanes may come unscathed through an aerial barrage, just as a number of men will get through an artillery barrage on the ground, but where quantities are concerned the position is very different. The barrage now put up by the London "Archies" shows that capable heads have taken charge, and anything

like a real raiding fleet would certainly have a very unpleasant time.

However, the effectiveness of purely home defence arrangements certainly does not detract from the advisability of carrying on an offensive-defensive against the German aerodromes in Flanders, where London defence really begins. After all, the cost of the shells in any one raid night by all the guns between the coast and London in various directions would pay for a good few aeroplanes to hunt the Hun in Flanders.

Also, those who are crying out so loudly for *immediate* raids on German towns might well consider whether it is not wiser first of all to achieve a definite effect and stop the raids on London by smashing all the German aerodromes in Flanders, before flying over those same aerodromes without touching them for the sake of doing moral and intellectual damage in Germany itself.

Those who remember a certain "Open Letter to the Air Board" in this paper some months ago will recall the various benefits therein set forth as bound to follow a really big aerial offensive on Germany, and to-day the value of such an offensive would be greater than ever, in that recent set-backs to the German Army in Flanders make any attack behind them of increased value, both because it will weaken the Army, and because it will have greater effect on the weakened *moral* of the people.

One at a Time.

Nevertheless, it is generally well to do one job properly first, and such bombing machines as are at first available may do better work on the aerodromes in Belgium. As General Smuts admitted, we should have started bombing Germany sooner if we had had enough machines to spare for the job. It would be a fatal error to neglect our opportunities in Belgium and to start bombing Germany with two or three machines at a time as they become available, and so just provide useful practice for the defences, without doing serious damage.

And apropos bombing aerodromes in Belgium, let it be here put on record that no praise can be too high for the able young officers of the R.N.A.S., who, despite all sorts of hindrances and obstructions, have built up not merely the nucleus of a real bombing fleet, but have evolved a science of bomb-raiding with its own strategy and tactics. Some day, perhaps, it may be possible to publish the real history of the bombing squadrons in Flanders. An interesting and surprising history it is—and yet not very surprising when one knows the people who obstructed, or failed to assist, progress when they had the opportunity not merely of serving their country, but of making history, and of winning undying fame for themselves as the founders of our offensive and defensive air fleets of the future.

However, when those squadrons have done their job as the advanced posts of the London defences, we can begin to think about hitting Germany really hard.

Our Geographical Advantage.

It does not seem to have occurred to many people that, despite the abolition of the Channel and the North Sea as a barrier against invasion, we in this country have an immense geographical advantage.

Imprimis, let it be assumed that the extreme range for bombing aeroplanes at present, and for some months to come, is somewhere in the region of 200 miles, that is to say, 400 miles in all, out and home in a straight line, with perhaps another 50 miles thrown in for divergences from the true course to avoid barrages and pursuing enemy machines. This is true to-day, despite Swedish rumours of 1,000 h.p. Gothas, capable of flying for 10 hours, as reported under the German Notes in this issue, but it is well that we should prepare for the advent of such machines in the future.

Many machines, in fact any respectable bombing machine, could fly for 800 or 1,000 miles, but it would have to carry all petrol and no bombs, and one may put a round trip of 450 miles as about the present limit with enough bombs to make the journey worth while.

Now it so happens that if you take any aerodrome in Belgium as a centre and draw from it an arc of a 200-mile circle across England, London is the only city, or even town, of importance within that circle. Harwich comes in, but that is a Naval port, anyhow, and so is Dover. Hastings, Eastbourne, and Brighton also come in, but they are only holiday resorts, and if they were bombed to bits it would not influence the mass of the population in the least, and probably a goodly number of undesirable aliens would be mercifully removed.

Even if London itself were made uninhabitable, it would not seriously affect England as a whole, and such a result is scarcely likely to happen, seeing that London can be adequately defended, by going to some little expense. Therefore, it is not likely to make any very serious difference to this country whether Germany goes on invading with a dozen aeroplanes at a time, as hitherto, or starts in with a couple of hundred. Also, even if Germany produced machines capable of doing an extra 200 miles, the industrial centres in the Midlands are by no means easy to find in the dark, none of them being on a tell-tale river.

Germany's Position.

Germany's position is, however, entirely different. The bulk of her important manufacturing centres are well within the 200-mile radius of Dunkirk, and even nearer to Arras—as the "Morning Post's" map pointed out. And very many of them are either on or close to the Rhine, a landmark which is easily picked up on the darkest night, provided there is no fog.

Now, a mere 500 machines—provided they are real big bombers, and not just "Christmas Trees," with bombs hung on as decorations—would do quite considerable damage if let loose all at once in batches of 50 on ten of those cities. The actual material damage would certainly be large, and the moral effect on a purely industrial population would be larger still. The result would be an immediate decrease in the output of munitions and an immediate increase in "peace talk."

The German people have been brought up to believe in the impregnable defence of the German Army. If they can be shown that the Army cannot defend them, they will receive the best possible lesson on the beauties of peace.

A Too Subtle Reason.

It has been suggested that the raids on London have been made with the express intention of forcing us to retaliate, with the idea that a few good raids on Germany would stir up the inhabitants of the industrial cities to resist strongly all aggression, and would thus create a powerful determination to fight to a finish—in fact, that our raids would pull the German people together, put democratic ideas out of their heads, and induce them to stick it out to the bitter end. The notion is ingenious but not convincing.

Apart from the Prussians the German peoples are docile and subservient to their masters, otherwise the Prussians would not have been able to dragoon whole kingdoms of them into obeying the will of Potsdam. Any merchant skipper will bear witness that the "square-head" German seaman is easier to bully than any other of the Pentecostal crew which he has been in the habit of bossing. Therefore, the Prussian High Command has made the psychological mistake of thinking that the English people can be as easily bullied into obedience. Hence the air raids.

The other reasons for the raids are, the perfectly good

intention to hang up our production of munitions—as Sir George Cave stated some months ago—and the equally good intention of forcing us to keep men and guns and aeroplanes for defence purposes on this side of the Channel, thus depleting our forces in France—in both of which intentions the enemy has had some limited success. The obvious way to put a stop to such successes is to retaliate, and to retaliate on a big scale.

Honesty the Best Policy.

The great thing is to do it properly. Let us get away from the cant of reprisals. Nothing can be more derogatory to our dignity as a nation than the semi-official notice issued last week, which read thus :—

"On the highest authority Reuter's Agency states that in consequence of the continued policy of Germany wantonly to attack open and unfortified places, and to cause death and destruction to the civilian population and civilian property. His Majesty's Government, after the most careful consideration, has decided to adopt air reprisals against Germany."

One prefers to believe the other semi-official notice, issued on Oct. 4th, thusly :—

The Central News learns from a highly-placed authority that the question of reprisals was yesterday seriously occupying the attention of both the Prime Minister and General Smuts, both of whom are, it is understood, strongly in favour of bombing the Rhine towns.

Our difficulty in the past has been that we have not had a sufficiency of aeroplanes to carry out reprisals on an extensive scale (said the authority). It is obviously of no use sending one or two machines to drop a few bombs. When we send our aeroplanes over the Rhine, they will have to go in very large numbers, for the bombing will have to be effective and attain far greater results in a single raid than those which the Germans have attained here in a number of raids.

At the moment all our machines are needed for military work, such as the bombing of hangars and hutments, and the essential work on the front. We have certain very definite objectives to attain before the winter sets in, and if these objectives are to be attained we cannot afford to release aeroplanes, at the moment, for the bombing of open towns. But the output of powerful machines has been greatly accelerated, and we shall before long be in a position to send them over to Germany.

The idea that the enemy possesses better and more powerful machines than we do is a totally erroneous one. Germany is doing nothing like the work on the front with her machines that we are doing with better and more powerful machines. When the time comes we can bomb German towns, and we shall bomb them heavily.

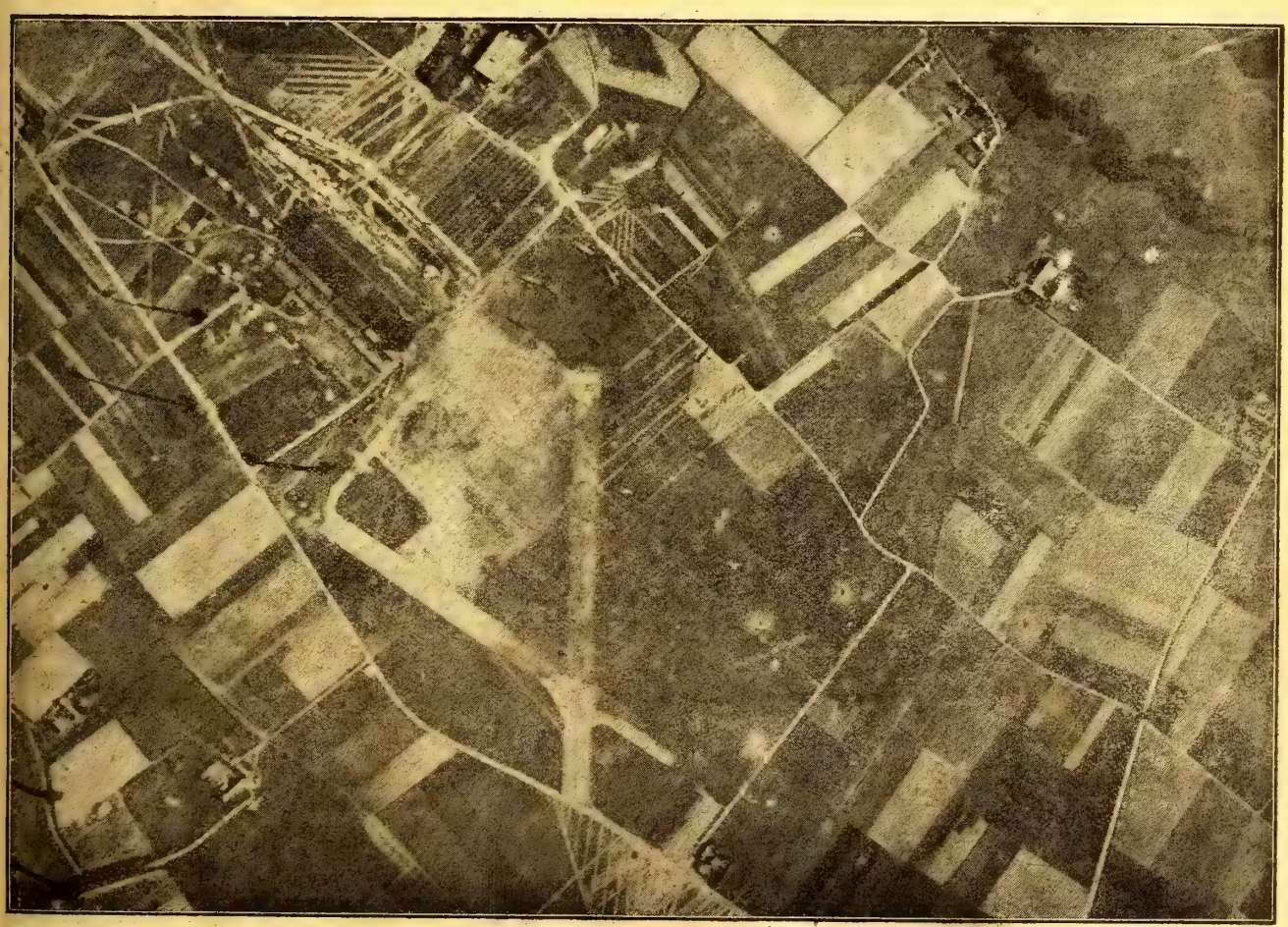
The Points of the Argument.

The chief point of that notice is that we have not had enough aeroplanes in the past, or, presumably, we should have hit Germany first. Someone is to blame for that lack of machines, about which this paper has been agitating for years, though the London Press has apparently only just discovered the lack.

The second interesting point is that "the output of powerful machines has been greatly accelerated." That output must be accelerated still further, and the people who can best do the accelerating are the workpeople engaged in building the machines. It is up to the workpeople of England to save themselves and their friends from being bombed.

The third interesting point is that we shall bomb German towns heavily when the time comes. The arrival of that time, like the acceleration of output, depends on the workpeople who are building the big bombing machines—which, presumably, is why some of them went out on strike recently.

Anyhow, it is now pretty clear that the chief protection of the British workman and his family against



GONTRODE AERODROME.—Photographed on Oct 1st after sundry raids. Bomb craters may be seen in the fields in the aerodrome itself, and the points where other bombs fell are indicated by arrows on the left. A number of aeroplanes may be observed near the big airship shed. The big quadrilateral figure in front of the shed is apparently the rolled-out landing and starting straights.

enemy air raids is the British workman himself, and managers may well impress that fact on their hands.

A Clear Course.

The course is now clear for a straight race with Germany for the mastery in the air. We have greater resources than Germany if we can use those resources. So far as the people at the top are concerned all is well. The political heads of the Empire are at last resolved to attack Germany thoroughly by air.

If we are to have an Air Ministry, as so many people believe, then, obviously, the first Air Minister should be Mr. Winston Spencer Churchill, whose splendid work at the Ministry of Munitions has confounded his critics, and has confirmed the high opinions which he won at the Home Office and at the Admiralty, and by his work in forming the R.N.A.S. against all opposition. He, at any rate, would have no hypocritical objections to bombing Germany. That is if he can leave Munitions.

The people who are officially responsible for the output of machines are equally resolved to get maximum quantities at all costs, and are going the right way to work to get them.

The people who are responsible for the technical design of the machines to be used are just as resolved to have the best quality of aeroplanes and engines for the job, and they are not likely to make many mistakes.

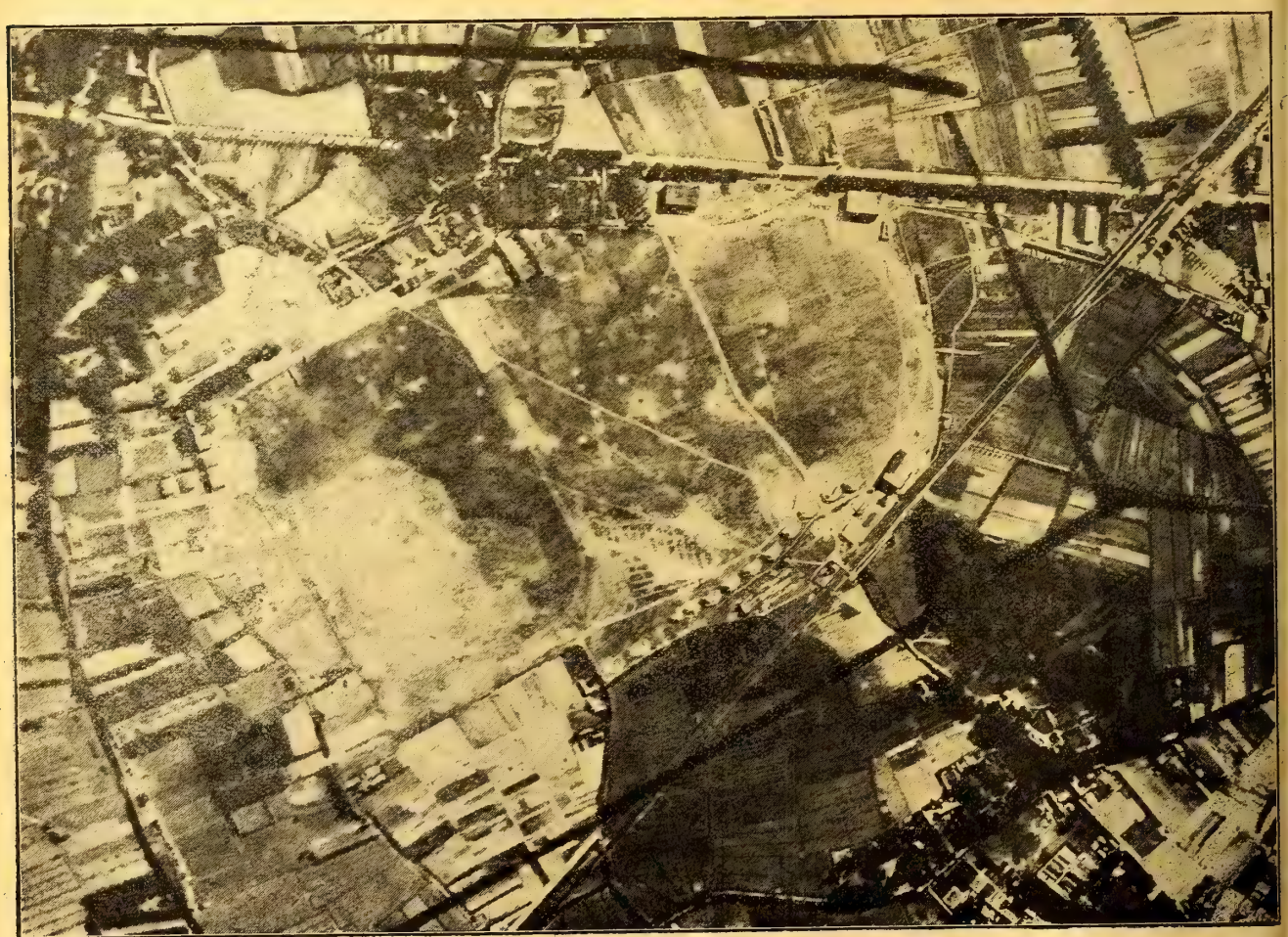
On Whom the Responsibility?

But the people at the top cannot get results unless those below are absolutely loyal. In that great and grimly humorous book, "The Secret Agent," Mr. Joseph Conrad sums up the situation with his usual skill in psychology. The Assistant Commissioner of Police, studying the case round which the book is written, becomes suspicious that the Chief Inspector of the Special Crimes Department is "up to something" on his own account, and reflects, "Here I am stuck in a litter of papers, supposed to hold all the threads in my hands, and yet I can but hold what is put in my hand, and nothing else. And they can fasten the other ends of the threads where they please."

There you have the whole philosophy of a Government Department. The chief may be the cleverest man in the world, and yet if his subordinates do not fasten the other ends of the threads in the right places, he must be a failure. Which is why a man of mediocre mind with a Heaven-sent gift for delegating duties to trustworthy subordinates is so often a greater success than a really brilliant man who is cursed with a faculty for backing the wrong horse, where the choice of assistants and their subordinates is concerned. We have had some notable examples of the latter type.

However, the moral of this sermon is that if Germany is to be bombed into her senses, and if real military damage is to be done at the same time, the responsibility for providing the machines and for bringing close the start of the invasion of Germany now rests not on the chiefs of departments, but on the subordinate officials, and on the workpeople in the factories.

The date on which the great invasion begins depends on Acting-Deputy-Sub-Assistant-Directors and their clerks in the Hotel Cecil, on A.I.D. inspectors and examiners and viewers in aeroplane and engine factories, and on foremen, charge hands, and workmen—and women—in those factories. They, and they alone, can advance, or delay, the day when we shall get our own back on Germany.—C. G. G.



ST. DENIS WESTREM AERODROME.—Photographed on Sept. 30th. Various bomb craters may be seen in the aerodrome, and several sheds have been destroyed. The herring-bone white lines near the sheds appear to be recently made drains in a wet patch. The big black lines have been drawn on the photograph to indicate the bombed area.

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THE REORGANISATION OF THE GERMAN FLYING CORPS.

THE 1916-17 PROGRAMME.

BY "AUSTERLITZ."

The Allied offensive of the Somme, in July, 1916, proved beyond doubt the overwhelming superiority of the Royal Flying Corps and of the French *Aviation Militaire* over the aerial forces of the enemy. During the preliminary stages of that battle a powerful aeroplane barrage of the Allies effectually prevented enemy aviators from crossing our lines to discover our preparations; in addition to this strategical blinding, the enemy's artillery was also deprived of its *eyes*, all of its kite-balloons being either destroyed or driven down by Allied aviators. German army orders, found on officers taken prisoner, acknowledged with great frankness the inferiority of their air service, and directly ascribed to it the costly defeat the enemy suffered.

Since then, however, the enemy has furnished a very considerable effort, with a view of re-establishing the aerial situation in his favour, and this effort, pragmatised by an ambitious building programme, eventually resulted in a complete reorganisation of the German Flying Corps.

This reorganisation, which now appears to be completed, affected both the tactical formation and the *matériel*. There are at present four major tactical formations within the German Flying Corps; these are:—

(1) Army squadrons (Armeeflieger-Abteilung).
(2) Army corps squadrons (Truppenflieger-Abteilung).
(3) Pursuit squadrons (Jagd-Staffeln).
(4) Battle wings (Kampf-Geschwader).

1. The *Army squadrons* are placed under the direct orders of the O.C. the aviation service of each army; they are primarily employed for strategical reconnaissances, but may sometimes be detailed on photographic work and even bombardments.

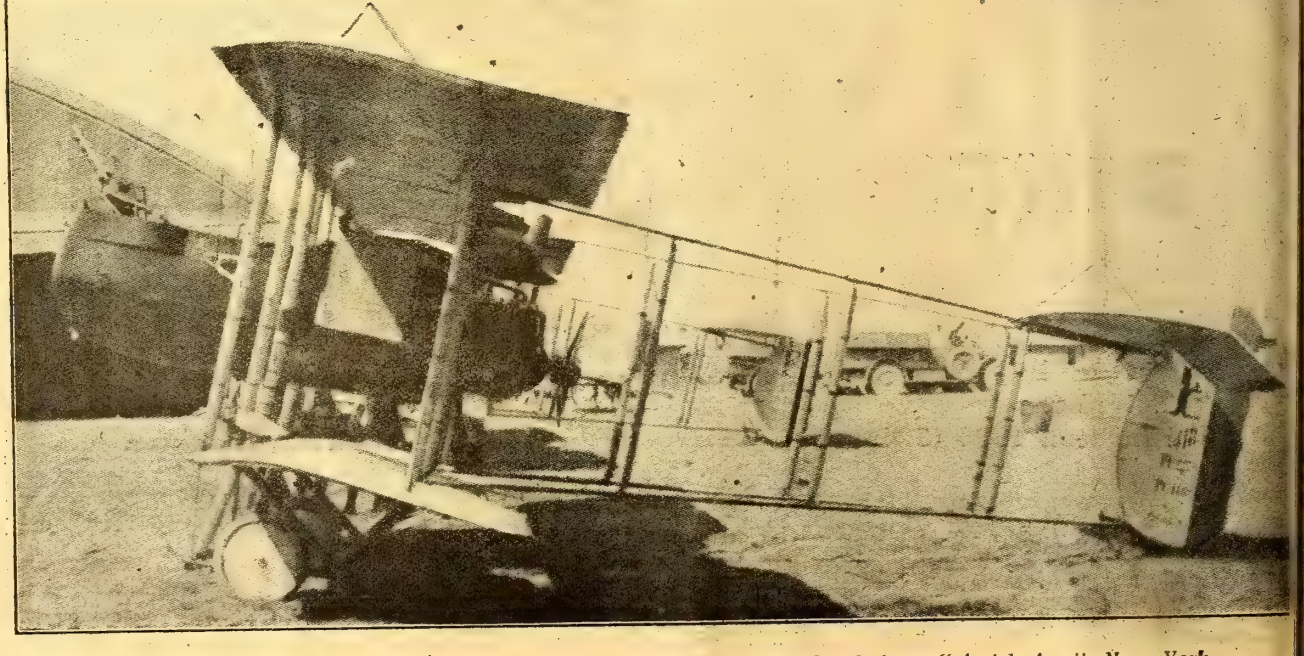
The *machines* forming the Army squadrons all belong to a standard model in which only minor details may vary, as a certain latitude is given the contractors in this respect. The machines are two-seater tractor biplanes of from 41 to 45 feet span, and are fitted with a stationary Benz or Mercédès engine developing from 225 to 240 horse-power. Their horizontal speed is from 100 to 105 miles per hour.

The *armament* consists of (1) two machine guns, one of which is mounted on a fixed emplacement in front of the pilot, and fires through the propeller by means of a synchronising device; the other machine gun is mounted *en barbette*, aft of the pilot, on the observer's seat; (2) one or two bomb gears, munitioned with four or six bombs.

The firms building this type are the L.V.G., the D.F.W., the Aviatik, and the Albatros. The latter firm has, however, recently produced a more powerful model, which is fitted with a 260-h.p. Mercédès engine, and develops a horizontal speed of 115 miles per hour. The climbing speed is said to be 6,600 feet in 9 minutes, fully loaded. It is confidently expected that eventually all the machines of the Army squadron type will be fitted with the new 6-cylinder, 260-hp. Mercédès engine, which is, though but slightly heavier, much more reliable than the 8-cylinder, 240-h.p. model. As the engine base of both models has the same width, only slight alterations would be necessary to fit the above described type of machine with the 260-h.p. model, although the wing area would probably have to be somewhat increased. It is worth noting that in 1916 the standard 150-h.p. two-seater tractor biplane was similarly modernised when it was fitted with the 175-h.p. Mercédès.

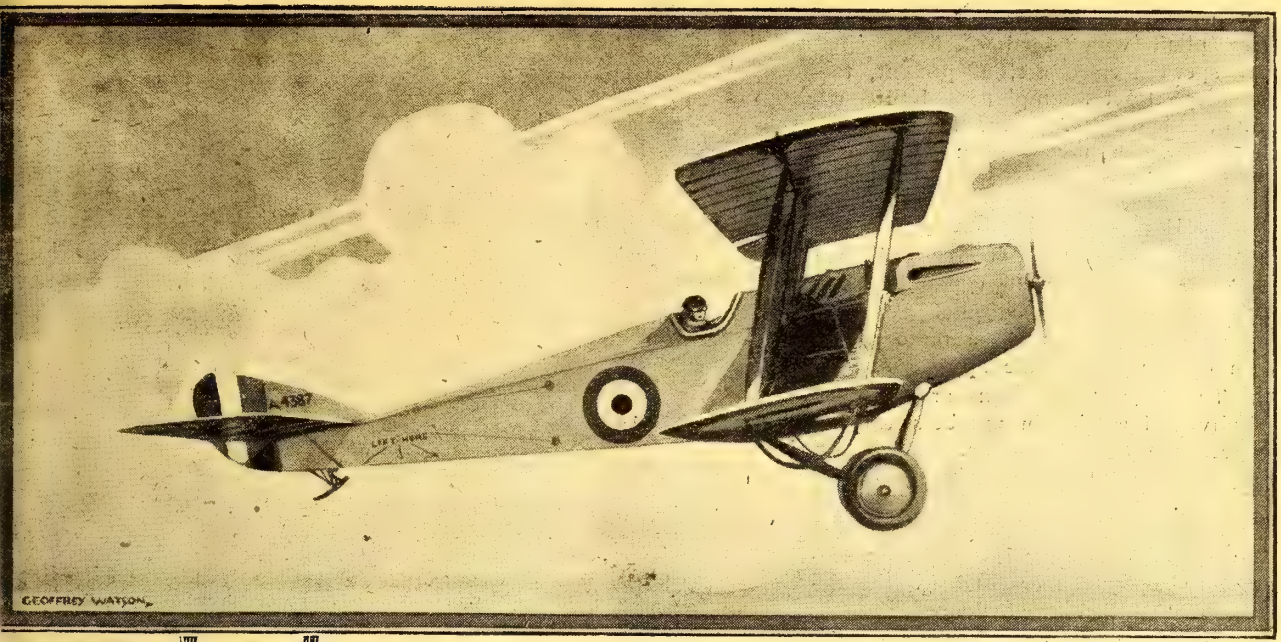
2. The *army-corps squadrons* are assigned to individual army corps, and are, as a rule, commanded by a captain who is placed directly under orders of the second bureau of the army corps staff. Their chief function is tactical reconnaissance, photography, gun spotting, and during active operations, contact patrol work between the units engaged in an advance.

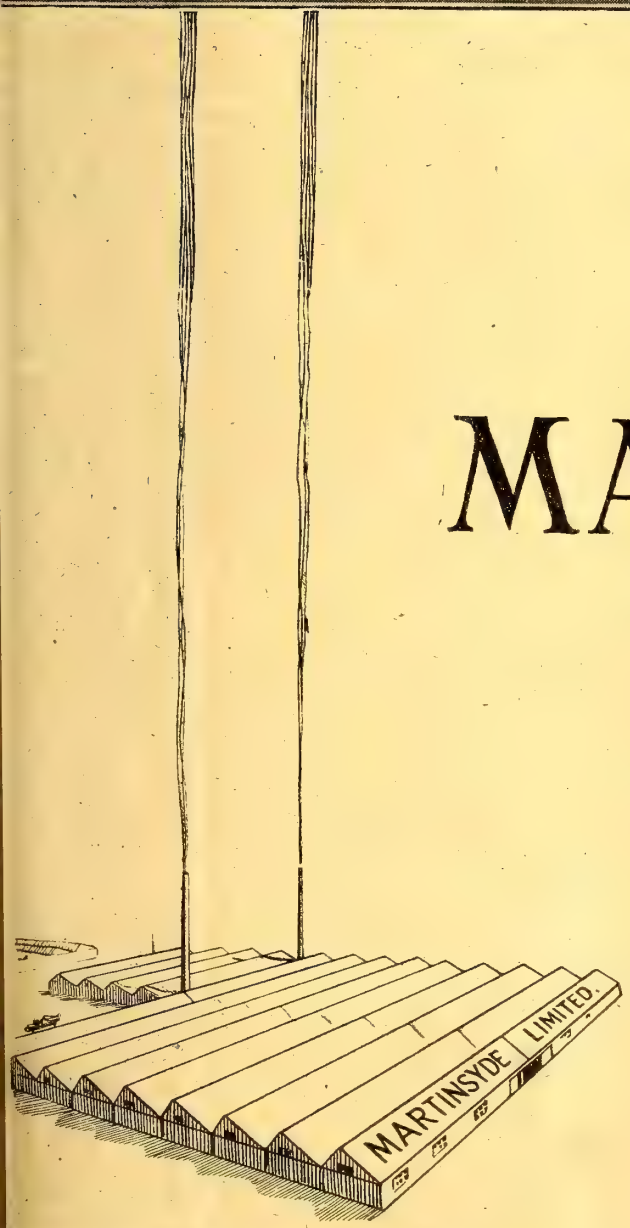
The army-corps squadrons are equipped with machines which are in every way similar to those forming the



(Reproduced from "Aerial Age," New York.

A "Horace" Farman Biplane with a Lorraine-Dietrich Engine.





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army squadrons, except for a smaller power plant which endows them with lesser speed. Such are, at present, the two-seater tractor biplanes built by A.E.G., Albatros, Aviatik, L.V.G., and Rumpler, which have a span of from 39 to 43 feet, and are fitted with a 6-cylinder, 175-h.p. Mercédès engine. The horizontal speed is from 90 to 95 m.p.h.

The armament is the same as on the army squadron type. Provision is made on these machines for the quick exchange of the bomb gear against a radio installation or a photographic apparatus.

3. The *pursuit squadrons* are assigned to individual armies in numbers varying in accordance with needs. Although their principal function is the defence of the army corps squadrons engaged in tactical reconnaissance work, they are also employed, in some instances, on convoy duty with bombers and for the destruction of Allied kite-balloons.

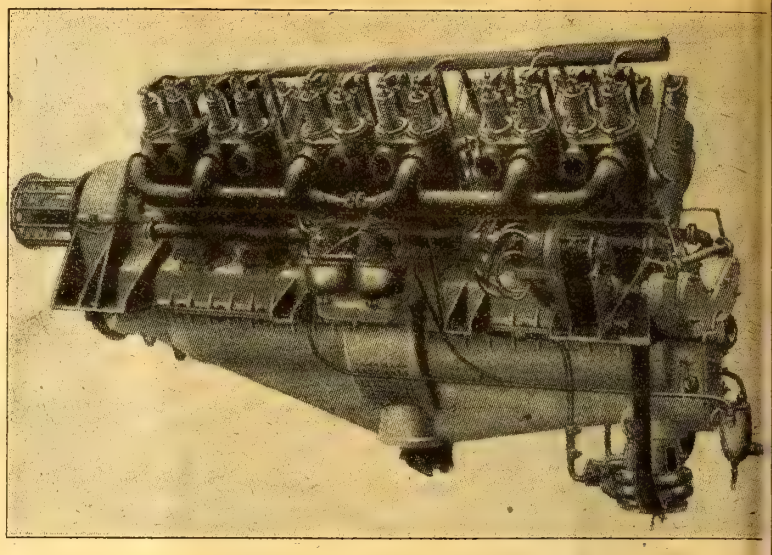
There appear to be, at present, on the Western front, about 40 pursuit squadrons, each of which consists of 12 machines. In some instances two or more squadrons are combined into pursuit wings which are placed under the leadership of particularly capable chiefs; these units are not permanently assigned to particular sectors, but are entrusted with special missions according to needs. Such are the now celebrated "travelling circuses" of Von Bülow and Von Richthofen. These special wings generally scour the Western front for Allied machines, travelling up and down the line from Nieuport to Belfort.

A number of pursuit squadrons are detached to the local defence of important German towns, in particular at Metz, Strasbourg, Mulhouse, Friedrichshafen, Stuttgart, Essen, Cologne, and Trèves.

The pursuit squadrons are equipped with one-seater biplanes of from 28 to 30 feet span which are fitted with a 175-h.p. Mercédès engine driving a tractor screw. The horizontal speed of these machines is from 110 to 125 miles per hour; they are principally built by Albatros, Fokker, L.T.G. (Lufttorpedo-Gesellschaft), and Roland.

The armament consists of two Spandau machine guns, mounted "fixé" in front of the pilot, which are synchronised to fire either simultaneously or alternately through the propeller. No bomb gear is provided.

The older pursuit machines, such as the Halberstadt, with a 120-h.p. Argus engine, the Rex, with a rotary 100-h.p. Rex engine, and the Fokker, with a 100-h.p. rotary Oberursel (German Gnôme), all of which are tractor biplanes, appear to be employed, at present, chiefly on the "easier" Eastern front.



A recent type of Körting Engine showing distinct signs of English influence. Sundry Sunbeam and Rolls-Royce points seem to have affected the German designers.

How long the 175-h.p. Mercédès pursuit machine w remain in commission on the Western front is alrea open to speculation, for it is known that the Teutonis Dutchman Fokker is experimenting with a purs machine fitted with a 260-h.p. Mercédès engine, wi which he expects to break all speed and climb record

4. The *battle wings* are placed under the direct orde of General Headquarters, and are not, as a rule, p manently assigned to particular sectors.

These wings consist of from 40 to 50 machines, and a subdivided into four or five squadrons. The machir are mostly Gotha twin-pusher biplanes, which have span of 78 feet, and are fitted with two 260-h.p. M cédès engines. (A detailed description of these machir appeared in The Aeroplane of July 18th, 1917.) A c tain number of bomber squadrons are, however, equipp with A.E.G. twin-tractor biplanes and a huge Rump bomber will shortly be placed in commission, unless is already in service. The Germans have no mean hop of this machine, particularly as regards speed and clin

There are, at present, three battle wings in comm sion. Wings No. 1 and No. 2 are mobile formatio each of which disposes of a special railway train for t transport of the *matériel* and the *personnel*. Th wings are assigned by General Headquarters, from ti to time, to such sectors as may require the co-operati of a powerful bombing unit.

Wing No. 3 is stationed in Belgium, and appears be chiefly entrusted with expeditions against Gr Britain. This wing consists of Squadrons No. 13, 15, 16, and 17, all of which are equipped with Got bombers.

AN INTERESTING ALLIANCE.

Those who were concerned with the early days of aviation will be interested to learn that Lieut.-Col. Mervyn O'Gorman, C.B. (T.F.Res.), late Superintendent Royal Aircraft Factory, has joined the forces of Mr. G. Holt Thomas, and has accepted a responsible post on the staff of the Aircraft Manufacturing Co., Ltd. Owing to his official positions in the past, Colonel O'Gorman has not been a familiar figure among people in the Aircraft Industry, and is, in fact, better known personally in the Motor Trade, with which he was connected before being absorbed into Government employment.

Nevertheless, those who had the privilege of hearing or reading the Wilbur Wright Lecture delivered by him to the Aeronautical Society recently will have recognised in him a mentality and a personality of no or nary kind. The foresight and the ability to envis the possibilities of aircraft, as demonstrated in t lecture, show the great potentialities of Colonel O'G man as concerns aviation after the war, and doubtedly his mental gifts in alliance with the orga ing power and business acumen of Mr. Holt Thon will strengthen considerably the already import position of the Aircraft Mfg. Co., Ltd.

Apart from his mental brilliance, Colonel O'Gorm possesses singular facility of expression, and one ho that at future meetings of the Aeronautical Society, whose Council he is a member, he will now be able find time to give the members more of those enterta ing little speeches which were so valued a feature the pre-war meetings of the Society.





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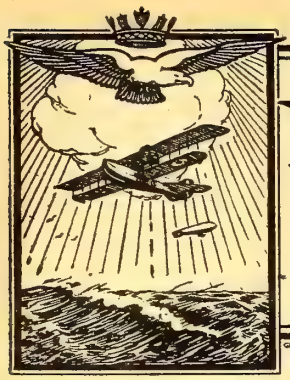
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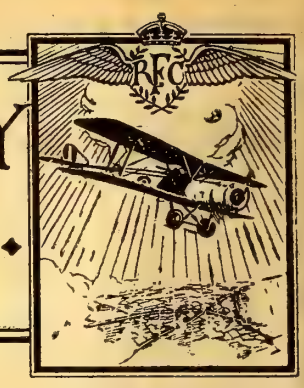




KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.



NAVAL and MILITARY AERONAUTICS



FROM THE "LONDON GAZETTE."

Admiralty, Sept. 25th.

Oct. 2nd.—R.N.A.S.—Flt. Sub-Lt. to be Flt. Lt. :—A. R. T. Pipon, Oct. 1st.

Temp. Flt. Sub-Lts. to be temp. Flt. Lts. :—W. H. Greer, M. J. M. Bryan, W. E. C. Parry, E.M. King, D. Knowles, A. B. Ovens, C. H. FitzHerbert, J. C. Watson, G. M. Kingsmill, A. M. Hughes, J. L. Carlin, J. A. B. Ball, A. R. Brown, W. J. Sussan, E. R. Pritchard, S. E. Ball, W. R. Walker, C. R. Sproatt, F. G. Hellmuth, N. R. Cook, D.S.C. ; J. A. Harman, G. E. Clinton, M. R. Kingsford, H. H. Arundel, W. F. Cleghorn, J. S. Maitland, C. J. Pyke, S. Burton, S. S. Benson, J. A. Yonge, P. E. Bayley, G. P. Powles, O. R. Griffin, E. Ball, J. Yates, F. S. Mills, M. H. Stephens, C. H. S. Butterworth, K. M. Smith, J. A. Shaw, A. V. Pullan, V. A. Watson, T. B. Williams, E. G. Cleverly, D. A. Macfie, W. H. Chisham, M. W. H. Evans, C. E. Pattison, E. E. Barnett, M. Hunter, C. A. Hervey, G. S. Harrower, A. M. Harding, V. A. Gibbs, J. A. M. Allan, B. P. Chase, C. W. Spencer, P. H. Hepburn, N. Wallis, N. E. Woods, W. A. Daniell, D. C. Woods, D. F. Ellis, H. Wild, G. M. F. O'Brien, G. G. R. Fraser, G. E. Nash, Q. S. Shiriff, H. Edwards, L. A. Sands, E. Anthony, D. C. Page, G. Llewellyn-Davis, M. Faux, J. C. Tanner, W. N. Tees, H. S. Murton, N. M. Macgregor, N. A. Magor, G. Breadner, T. C. Wilkinson, J. G. Ireland, C. A. Beck, C. R. H. Stewart, V. E. Sieveking, D.S.C. ; N. D. M. Hewitt, H. B. Smith, G. P. Carr, H. B. Brenton, C. S. Hay, A. Y. Wilks, M. C. Dubuc, J. F. Chisholm, A. T. Whealy, C. L. Bailey, A. H. Allardyce, A. Frauenfelder, D. S. R. Kent, W. H. Strettell-Miller, A. E. H. Roberts, G. B. Anderson, L. H. Slatter, E. P. M. Davis, L. W. Ormerod, W. G. R. Hinchcliffe, A. J. Enstone, D.S.C. ; T. E. B. Howe, S. J. Featherston, L. N. Glaisby, C. P. O. Bartlett, W. E. C. B. C. Forsyth, R. M. Hughes, F. H. Wallers, F. P. L. Washington, R. K. Slater, J. B. Daniell, A. G. MacDonald, S. H. Gaskell, W. E. Flett, D.S.C. ; E. D. Davis, B. A. Smart, T. G. C. Wood, L. M. Bailey, C. F. M. Chambers, L. G. Maxton, H. V. Rowley, I. P. Millar, P. K. Fowler, W. B. Foster, A. H. S. Lawson, H. M. Ireland, A. P. Haywood, W. L. Anderson, D.S.C. ; J. Andrews, J. R. Blunt, T. P. M. Alexander, C. B. Wincott, R. J. Paul, S. D. Scott, A. W. Carter, D.S.C. ; C. S. Nunn, E. S. Goodwin, A. W. I. Ashe, D. F. FitzGibbon, A. M. Fitz-Randolph, H. A. Mumford, J. D. Mackenzie, J. R. Swanston, R. F. L. Dickey, D.S.C. ; H. Lawson, C. Boumphrey, P. Brend, R. P. Minifie, E. S. Arnold, N. G. Hodson, E. Pierce, A. S. Mather, C. B. Ridley, N. von L. Tapscott, C. R. Morrish, D.S.C. ; H. G. Boswell, D.S.C. ; A. B. Ellwood, A. L. Sims, F. E. Banbury, P. Wood, W. A. Scott, A. W. Farquhar, P. C. Wood, C. C. Purdy, C. W. Bailey, C. H. Keith, Oct. 1st.

Temp. Obsr. Sub-Lts. to be temp. Obsr. Lts. :—B. A. Malet, D. S. Earp, R. M. Inge, W. C. Jameson, G. E. Wright, F. W. Mardock, L. V. Pearkes, C. N. Downes, P. Bewsher, W. C. Parker, E. J. Travers, C. O. Palmer, W. R. Abbott, A. O. Jones, M. O. F. England, R. W. Frazier, E. W. C. Corry, C. K. Chase, D.S.C. ; L. E. Nicholson, C. Chapman, W. L. Amos, Oct. 1st.

Admiralty, Sept. 27th.

Sept. 29th.—R.N.A.S.—Flt. Comdr. T. A. Rainey, R.N., who relinquishes his appt. on account of ill-health contracted in the Service, to retain his rank, Sept. 17th.

War Office, Oct. 2nd.

REGULAR FORCES.—Staff.—Attd. to Hdqr. Units.—The following temp. appt. is made at the War Office :—

Staff Lt.—Temp. Lt. J. E. B. Thornely, Gen. List, from a Flying Officer, Aug. 31st.

Establishments.—R.F.C.—Mil. Wing.—Flt. Comdrs.—From Flying Officers :—Lt. P. V. Tanner, Spec. Res., and to be temp. Capt. whilst so empld., July 18th. Maj. E. G. Joy, Canadian Local Forces ; temp. Capt. H. R. Coningsby, Midd'x R. ; Capt. G. E. Chadwick, M.C., E. Lan. R. ; and to be temp. Capts. whilst so empld. :—Temp. Lt. H. E. Scoones, Gen. List ; temp. Lt. W. M. Fry, M.C., Gen. List ; temp. Lt. C. H. B. Readman, Gen. List ; Lt. L. V. Hirst, Spec. Res. ; Lt. C. Faber, Spec. Res., Sept. 1st. Temp. Sec. Lt. A. J. P. Hytch, Gen. List, Sept. 17th. Sec. Lt. (temp. Lt.) C. Eales, Devon. R., T.F. ; temp. Sec. Lt. W. R. Fish, Gen. List, Sept. 18th.

Park Comdr.—Temp. Capt. L. Y. K. Murray, Gen. List, from an Equipment Officer, 1st Cl., and to be temp. Maj. whilst so empld., Aug. 31st.

Special Reserve of Officers.—Supplementary to Regular Corps.—R.F.C.—Mil. Wing.—Lts. (temp. Majs.) to be Capts. :—S. A. Currin, G. P. Grenfell, April 1. Sec. Lt. (temp. Maj.) T. G. Clarson to be Lt., Sept. 1st.

War Office, Oct. 3rd.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing.—Flt. Comdr.—Temp. Sec. Lt. A. A. N. Pentland, Gen. List, from a Flying Officer, and to be temp. Capt. whilst so empld., Sept. 18th.

Equipment Officers, 1st Cl.—From the 2nd Cl., and to be temp. Capts. whilst so empld. :—Sec. Lt. (temp. Lt.) H. J. de C. Moore, Spec. Res., Aug. 31st. Qrmr. and Hon. Lt. (temp. Lt.) W. E. Aylwin, R.F.C., Sept. 10th.

Schools of Instruction.—Schools of Mil. Aeronautics.—Instr.—Graded as an Equipment Officer, 1st Cl.—Sec. Lt. (temp. Lt.) W. N. Cronshaw, E. Lan. R., T.F., from an Asst. Instr. (graded as an Equipment Officer, 2nd Cl.), and to be temp. Capt. whilst so empld., July 6th.

School of Technical Training.—Chief Instr.—Graded as a Park Comdr.—Lt. (temp. Capt.) C. G. Tucker, Spec. Res., an Equipment Officer, 1st Cl., and to be temp. Maj. whilst so empld., Sept. 10th.

Gen. List.—Sec. Lt. (temp. Lt.) E. S. Cohen, Spec. Res., an Equipment Officer, 2nd Cl., to be temp Capt. whilst specially empld., vice Lt. (temp. Capt.) C. H. Awcock, R.A., who relinquishes his temp. rank, Aug. 11th.

Memorandum.—To be temp. Hon. Capt. :—Temp. Hon. Lt. R. E. Rollings, whilst empld. as Inspr., Aeronautical Inspn. Dept., Aug. 1st.

* * *

The following is included in a list of decorations and medals conferred by the King of Serbia to the British Forces for distinguished services rendered during the course of the campaign :

Order of the White Eagle, 4th Class (with Swords).
Temp. Capt. Gilbert Ware Murlis Green, D.S.O., M.C., Gen List and R.F.C.

War Office, Oct. 4th.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing.—Sqdn. Comdr.—Sec. Lt. (temp. Capt.) J. T. P. Whittaker, M.C., A.S.C., from a Flt. Comdr., and to be temp. Maj. whilst so empld., June 21st. (Substituted for notification of Aug. 31st.)

Flt. Comdrs.—From Flying Officers, and to be temp. Capts. whilst so empld. :—Temp. Sec. Lt. A. C. H. Groom, Gen. List, Sept. 18th. Lt. R. Duncan, Canadian Local Forces, Sept. 19th.

Oversea Contingents.—Canada.—Can. Gen. List.—Temp. Lt (actg. Maj.) W. A. Bishop, V.C., D.S.O., M.C., to be temp. Capt., April 8th. Temp. Capt. M. R. Taylor is secd. for duty with the R.F.C., Aug. 31st.

War Office, Oct. 5th.

REGULAR FORCES.—The following N.C.O.'s to be Sec. Lts. for service in the Field :—

R.F.C.—Mil. Wing.—Actg. Sjt.-Maj. J. H. Ferguson, Aug. 1st. Sjt.-Maj. F. C. Griffin, Sjt.-Maj. C. W. Brown, Sept. 3rd.

N.C.O.'s to be temp. Sec. Lts. :—

R.F.C.—Mil. Wing.—Sjt. W. F. Mayoss, Sept. 1st. Flt. Sjt. W. W. Grant, Sept. 5th.

Establishments.—R.F.C.—Mil. Wing.—Staff Officer, 2nd Cl. —(Graded as a Brig.-Maj.).—Maj. A. H. W. Elias Wynn, Ind. Inf., Sept. 10th.

Flt. Comdr.—Sec. Lt. A. C. Youdale, Spec. Res., from a Flying Officer, and to be temp Capt. whilst so empld., Sept. 21st.

Balloon Co. Comdr.—Graded as a Flt. Comdr.—Capt. G. F. M. Warner, R. Berks. R., from a Balloon Officer, Aug. 1st.

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Adjt.—Temp. Sec. Lt. R. A. Wilton, M.C., R. War. R., to be transfd. to R.F.C., Gen. List, and to be temp. Capt. (with pay and allowances as Lt.) whilst so empld., Sept. 19th.

Equip. Officers, 1st Cl.—From the 2nd Cl., and to be temp. Capts. whilst so empld. :—Temp. Lt. H. N. Nowell, Gen. List; Lt. P. Adams, Spec. Res.; Sec. Lt. (temp. Lt.) D. W. Wilson, Spec. Res., Aug. 31st. Sec. Lt. (temp. Capt.) J. Pearce, K.O.S.B., from an Instr. (graded as an Equip. Officer, 1st Cl.), Armament School, and to retain his temp. rank whilst so empld., Sept. 25th.

Gen. List.—Temp. Sjt.-Maj. A. Ledger, from R.F.C., to be Sec. Lt., Sept. 10th. Sjt.-Pilot G. Fineran, from R.F.C., to be temp. Sec. Lt., Sept. 20th.

Special Reserve of Officers.—Supplementary to Regular Corps.—R.F.C.—Mil. Wing.—Sec. Lts. (temp. Maj.) to be Lts. :—G. I. Taylor, Sept. 1st. H. G. Gold, Sept. 3rd. Sec. Lts. (on prob.) confirmed in their rank :—T. L. Gitsham, H. E. Jones, N. C. Ashton, R. L. Lyster-Smythe, C. Knowles, S. P. Ashton, S. L. Crowther, G. F. P. Warren, F. H. Goodwin, L. F. Bennett.

War Office, Oct. 6th.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing.—Flt. Comdr.—Lt. G. T. Wilcox, High. L.I., T.F., from a Flying Officer, and to be temp. Capt. whilst so empld., Sept. 21st.

Adjt.—Sec. Lt. H. O. Barnaby, R.F.A., T.F., from actg. Lt., R.A., and to be temp. Capt. (with pay and allowances as Lt.) whilst so empld., vice Capt. P. A. Landry, Can. Inf., Sept. 6th.

Schools of Instruction.—Central Flying School.—Instr.—Lt. (temp. Capt.) H. W. G. Jones, M.C., Welsh R., T.F., a Flt. Comdr., vice Capt. (temp. Maj.) G. Allen, Conn. Rang., Aug. 2nd.

Gen. List.—Sjts., from R.F.C., to be temp. Sec. Lts. :—M. Andrews, Sept. 29th. Allan Armstrong, Sept. 24th.

War Office, Oct. 8th.

REGULAR FORCES.—General Staff.—3rd Grade.—Temp. Lt. W. E. de B. Whittaker, attd. L'pool R., to be temp. Capt., and to be transfd. to Gen. List, Sept. 4th.

Establishments.—R.F.C.—Mil. Wing.—Flt. Comdrs.—From Flying Officers and to be temp. Capts. whilst so empld. :—Temp. Sec. Lt. R. H. Ayre, Gen. List, Sept. 17th. Temp. Lt. H. O. W. Hill, Gen. List, Sept. 21st.

Adjt.—Capt. E. J. Needham, North'n R., Spec. Res., Sept. 19th.

Spec. Appt.—(Graded as a Park Comdr.).—Lt. (temp. Capt.) O. G. W. G. Lywood, Norf. R., from a Spec. Appt. (graded as an Equipment Officer, 1st Cl.), and to be temp. Maj. whilst so empld., Sept. 6th.

Equipment Officers, 1st Cl.—Lt. F. Tedman, Spec. Res., from the 2nd Cl., and to be temp. Capt. whilst so empld., Sept. 1st.

Schools of Instn.—School of Technical Training.—Asst. Comdr.—(Graded as a Park Comdr.).—Capt. (temp. Maj.) L. W. F. Turner, Spec. Res., from a Chief Instr. (graded as a Park Comdr.), and to retain his temp. rank whilst so empld., Sept. 10th.

NAVAL.

The following appointments have been made in the Royal Naval Air Service :—

Oct. 4th.—Mr. E. L. Taylor granted a temp. commission as Lt., R.N.V.R., with seny. Oct. 3rd.

Oct. 5th.—Mr. H. Batsford entered as Lt., R.N.V.R (temp.), seny. Sept. 28th.

Oct. 6th.—Proby. Flt. Officer (temp.).—B. H. Sisson, promoted to Flt. Sub-Lt. (temp.); seny. Sept. 10th; and to be Flt. Lt. (temp.), Oct. 4th.

The following temp. entries (R.N.V.R.) have been made :—Lt.—F. Rooks, seny. Oct. 4th. Sub-Lts.—H. Churchman and B. Walker, seny. Oct. 2nd and 6th.

A.M. (II.).—J. A. C. Sumner granted temp. commission as Lt. (R.N.V.R.), seny. Oct. 5th.

Admiralty Communiqués.

Oct. 2nd.—During the night of Sept. 30th naval aircraft dropped bombs on St. Denis Westrem aerodrome (south-west of Ghent), which fell among hangars and set fire to one on the south side. The fire spread, and was visible thirty miles away.

Bombs were dropped on Zeebrugge Lock gates.

Another bombing raid on St. Denis Westrem was carried out by day, at 12.30 p.m. on Oct. 1st, several direct hits being observed, also two sheds on fire in the south-east corner of aerodrome. The large shed on south side of the aerodrome reported as being hit and set on fire on Sunday night appears to be completely gutted.

All machines returned safely.

Oct. 3rd.—During the night of Oct. 1st-2nd a bombing raid by naval aircraft was carried out on lock gates at Zeebrugge. Many bombs were dropped.

Yesterday (Tuesday) afternoon an attack was made on St. Denis Westrem aerodrome, where a quantity of explosives was dropped on sheds and machines.

During usual fighter patrols two enemy aircraft were shot down out of control.

All our machines returned safely.

Oct 4th.—Bombing raids were carried out during yesterday (Wednesday) by naval aircraft on the following objectives :—

St. Denis Westrem,
Zeebrugge Lock Gates,
Bruges Dock and other targets.
Thourout Railway Junction.

All our machines returned safely.

The Casualty List.

Reported on Oct. 3rd.

Previously reported Missing, now reported Killed.—
Reeves, Flt. Lt. F. P., R.N.
Hillaby, Flt. Sub-Lt. E. C., R.N.
Ramsay, Flt. Sub-Lt. D. W., R.N.
Millward, Flt. Sub-Lt. K. H., R.N.

Reported on Oct. 4th.

Wounded.—Bramhall, Flt. Sub-Lt. C. E., R.N.
Royal Naval Division.—Wounded.—Laughton, Sub-Lt. B. D., R.N.V.R., attd. R.F.C.

Reported on Oct. 6th.

Accidentally Drowned.—Grant, Flt. Sub-Lt. James D., R.N.
Royal Naval Division.—Died of Wounds.—Laughton, Sub-Lt. Bertram, D., R.N.V.R., attd. R.F.C.

Reported on Oct. 8th.

Died of Wounds.—Beattie, Flt. Sub-Lt. W. J., R.N.
Slightly Wounded.—Compston, Flt. Com. R. J. O., D.S.C., R.N.
Duveen, Lt. H., R.N.V.R.
Prisoners.—Alcock, Flt. Lt. John W., R.N.
Aird, Flt. Lt. H.R., R.N.
Wise, Mr. S. J., Wrnt. Officer, R.N.A.S.
Previously reported Missing, now presumed Killed.—
Eyre, Flt. Lt. C. A., R.N.
Reid, Flt. Sub-Lt. E. V., D.S.C., R.N.
Kendall, Flt. Sub-Lt. E. H., R.N.
May, Flt. Sub-Lt. T. C., R.N.
Roach, Flt. Sub-Lt. G., R.N.
Smith, Flt. Sub-Lt. H. D., R.N.

PERSONAL NOTICES.

Deaths.

DOUGLAS.—Lt. James Douglas, R.N., was killed while flying on Oct. 4th. The seaplane side-slipped and fell in the sea, and turning over pinned him under the water.

HILLABY.—Flt. Sub-Lt. Eric Crowther Hillaby, R.N., the second son of Dr. and Mrs. A. Hillaby, The Limes, Pontefract, who was previously reported missing on July 6th, 1917, is now reported by the Admiralty as killed on that date, aged 19. He joined the Grahame-White School of Aviation in January, 1916, and after a short course of instruction gained his pilot's certificate, and was gazetted Flight Sub-Lieut. in August, 1916. His Squadron Commander in a letter to his father described him as a valuable pilot and one who had made for himself an excellent name in his squadron.

LAUGHTON.—Sub-Lieut. Bertram Douglas Laughton, R.N.V.R., attd. R.F.C., who died from wounds received in aerial combat on Oct. 1st, was the younger son of Mrs. E. J. Laughton, of 35 Cloudesdale Road, London, S.W.17. He was 23 years of age.

NEWBERRY.—At an inquest at Edmonton on Oct. 4th on Flt. Comdr. John Newberry, R.N., aged 24, it was stated that on Sept. 28th he ascended from an Essex aerodrome with a Probationary Flight Officer, whom he was instructing. The machine suddenly nose-dived and fell to the ground. It was stated that the pupil lost his nerve in mid-air and clung on to the controls, thus preventing the pilot from handling the machine. Had the aeroplane been flying higher Flt. Comdr. Newberry might have been able to recover control. The probationary flight officer was stated to be still in hospital. A verdict of accidental death was returned.

Flt. Comdr. Newberry was the second son of Mr. and Mrs. C. Newberry, of the Orange Free State. He was born in South Africa, and was educated at St. Andrew's College, Grahamstown, where he gained the Goold Adams medal for science. In 1913 he entered King's College, Cambridge, and thence joined the R.N.A.S., having independently taken his pilot's certificate at the Beatty School. He became an instructor, and then went abroad, where his work with the French Air Service gained him the Croix de Guerre.

On Feb. 20th last he married Mollie, second daughter of Mr. H. P. Cowper, of New South Wales. Early in March he was moved to Dunkirk, and it was there he helped to bring down the first Hun actually over the town, for which the citizens presented him with a specially struck medal. Shortly after this he was given the rank of Flt. Comdr., and after a much-needed


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rest took up instruction work at Chingford. It was here that the accident occurred which caused his death on Sept. 28th. The machine nose-dived from about 200 ft., and Flt. Comdr. Newberry only survived a few minutes.

RAMSAY.—Flt. Sub-Lt. Donald W. Ramsay, R.N.A.S., aged 20, who was reported missing on July 7th, while fighting over the enemy's lines, is now officially reported as killed on the same day. He was the second son of Mr. and Mrs. N. F. Ramsay, of 131, Osborne Road, Newcastle, and The Grange, Alnmouth. He was educated at Corchester Preparatory School, Corbridge-on-Tyne, and at Oundle, where in 1915 he was captain of the school and also captain of the Rugby XV.

His Squadron Commander has written to Mr. Ramsay's father:—"When I was leading a flight your son was with me, and I am proud to say was as staunch and reliable a follower as I had. We had been in many little fights together, and really had something in common with each other. He went out to do a job over the enemy's country, and was last seen keeping some enemy scouts off a machine he was protecting. It is well known in this squadron what a noble and gallant effort his was, and his place in the squadron will be hard to fill. He was a most good-natured and sterling officer, and loved by all with whom he came in contact."

THOMAS.—Flight Lieutenant John Emyr Thomas, R.N., second son of Mrs. Thomas, of 7, Castle Street, Ruthin, N. Wales, and brother of Mr. G. H. Thomas, N.P. Bank, Denbigh, who was killed while flying near Yeovil some weeks ago, was 23 years of age, and was educated at Ruthin Grammar School, Denbigh, and Wrexham County Schools, and was apprenticed to the engineering trade at Messrs. Singers, Coventry. He had only just served his apprenticeship when the war broke out, and he was among the first Denbighshire men to join the colours. He joined the Royal Naval Division in Sept. 1914, was with the division in Antwerp, and as a dispatch rider experienced his share of the rigours of the Gallipoli campaign, being temporarily invalided and being sent to Malta in November, 1915.

On his recovery he joined the Royal Naval Air Service in April, 1916, and "gaining his wings" developed into one of the most efficient men in the service. After flying on the Somme he was made a "ferry pilot," taking new machines over to France. Quiet, genial, and unobtrusive in manner, he had nevertheless any amount of grit in his composition, as his record in Gallipoli attested.

His Squadron Commander writes:—

"His duties necessitated a considerable amount of flying skill, in that he had to be prepared to fly every type of machine, and this I can say he did to my utmost satisfaction, having delivered innumerable machines from the various makers' works in this country to the war centres in France."

His Flight Commander writes:—

"He was one of the finest and most reliable pilots we have had, and the work of his department suffers very considerably owing to his absence."

VERNON.—Sqdn. Comdr. Theophilus Vernon, R.N., who was killed in an attempt to save a machine of his squadron, was second son of Mr. and Mrs. J. Y. V. Vernon.

WRIGHT.—Flt. Sub-Lt. Noel Stafford Wright, R.N. (killed on Sept. 18th), was son of Dr. and Mrs. Southey Wright, of The Firs, Wool, Dorset. He was in his 19th year, and had seniority of Jan. 21st, 1917.

Engagement

YOUNG—GROSE.—The marriage of Lt. T. Kenneth Young, R.N.V.R., and Miss H. Dorothy Grose, of "Tiutogel," Beckenham, will take place quietly on Oct. 27th at Elm Road Baptist Church, Beckenham, at 9 a.m. Will friends please accept this, the only invitation.

Marriages.

BARTHOLOMEW—SMERDON.—On Sept. 29th at Binfield Church, Flt. Lt. Cyril Hargreaves Farquharson Bartholomew, R.N.A.S., eldest son of Mr. and Mrs. James Bartholomew, of St. Leonards, was married to Nino, only daughter of the late Col. F. G. B. Smerdon and Mrs. Smerdon, of Binfield, Berks, by the Rev. O. S. Laurie, rector of Poplar, E., and the Rev. A. V. Richards.

MURRAY—THORPE.—On Sept. 26th, at the Parish Church, Great Yarmouth, by the Rev. H. H. Thorns, M.A., Rector of Rockland, Norfolk, Flt. Lt. Leslie Ethelbert Ruthven Murray, R.N., elder son of Mr. and Mrs. Ethelbert T. Ruthven Murray, of The Eyrie, Radlett, Hertfordshire, and eldest grandson of the late Sir James A. H. Murray, LL.D., D.C.L., of Oxford, was married to Ethel Mildred Dorothy, younger daughter of Mr. and Mrs. H. L. Thorpe, of Westhaye, Salisbury Road, Great Yarmouth.

The "Morning Post" of Oct. 6th published some further reports of how the Navy deals with the air and submarine services of the enemy. Here, for instance, is an account by a Squadron-Commander of the Royal Naval Air Service after a recent hostile air raid. He had been flying continuously under war conditions in France, bombing and fighting, for upwards of 18 months.

"When at 11,000 feet," runs his report, "I saw 10 Gothas coming inland. I climbed up to them, and engaged one on the right of the formation, about three miles out to sea, at something over 12,000 feet. Fired 100 rounds from straight behind his tail at 100 yards range. Bullets were seen to enter the Gotha's fuselage. Machine started into a slow spin. I followed and fired about 25 more into him to make sure. My gun then jammed; and, in trying to clear, I got into a very fast spin with my engines on. Got out of this just in time to see the enemy crash into the sea.

"I then landed, had my gun jam cleared, and went up after the remaining eight Gothas—one had been shot down in flames—and caught up with them at 14,000 feet, and engaged them in turn from both above and below. Then devoted all my attention to one Gotha, and after firing 200 rounds into him, silenced both his guns. I think both German gunners must have been hit, as I was able to get within 60 feet of him without being fired at. I finally ran out of ammunition."

Two British seaplanes on submarine patrol above the North Sea sighted a submarine on the surface travelling at about 14 knots. Two men were observed on the conning-tower. The seaplanes swooped down to a height of 800 feet, and the leading machine dropped a bomb, which burst on the starboard side of the submarine half-way between the stern and conning-tower. The submarine heeled slowly over to port and remained in that position. The bow rose into the air as she stopped and began to sink.

The second seaplane then dropped her bomb, which burst in front of the conning-tower, and as the submarine sank another bomb was dropped by the first machine, which had wheeled round and passed over the spot 15 seconds later. Having disposed of their quarry, the two then circled round for a quarter of an hour searching for possible survivors. None were seen.

On another occasion a seaplane on patrol overheard a hostile wireless signal, apparently in close proximity; shortly afterwards a large submarine was sighted lying on the surface a mile ahead. Flying at 80 miles an hour, the seaplane whizzed over the enemy and released a bomb. The submarine simultaneously fired a round with his foremost gun, the shell bursting 50 feet in front of the seaplane. As the latter turned, the bomb which he had dropped exploded, tearing a great rent in the hull of the submarine.

Flashes of flame were then seen spurting from the water ahead, and through the mist three more hostile submarines were sighted in line abreast, reinforced by three hostile destroyers and two seaplanes. All were firing at the British seaplane which, however, turned and again flew over the sinking submarine. A second bomb was dropped, and the submarine sank leaving a large quantity of oil, air-bubbles, and wreckage floating on the surface. Her bombs exhausted, the seaplane returned; having first photographed the sinking submarine and its would-be avengers.

MILITARY.

G.H.Q. Communiqués.

Oct. 2nd, 9.30 p.m.—On the 1st inst. a heavy ground mist hindered aerial work until the evening. Some successful observation was then accomplished for the artillery, and our aeroplanes took many photographs.

Bombing was again carried out by day and night. Gontrode aerodrome (south-east of Ghent) was twice attacked, and several bombs were observed to burst on the sheds. Carnières aerodrome near Cambrai, was also bombed, and a large hangar was hit. Two attacks were made on a German long-range gun and two others on hostile billets in the battle area.

During the month of Sept. 125 tons of bombs have been dropped by our aeroplanes on various enemy targets.

Hostile aircraft were not particularly active during the day but carried out some bombing by night. Five German machines were brought down and three others driven down out of control. Two of our aeroplanes are missing.

Oct. 3rd, 9.13 p.m.—On the 2nd inst. weather was again misty, but in spite of this much successful observation work was done for the artillery and many photographs were taken. Some of these showed the damage done by our bombing raids.

About eight tons of bombs were dropped by our aeroplanes on various targets, and hits were observed on three aerodromes in the Courtrai area and on a fourth near Cambrai. Huts and dumps near Douai and sidings at Roulers were also successfully attacked.

The enemy generally avoided our fighting aeroplanes, but attacked our long-distance bombing machines vigorously when far east of the line. Six German machines were brought down in air fighting and four others were driven down out of control. Six of our aeroplanes are missing.

Oct. 4th, 10.11 p.m.—The weather, which, during our preparations for the attack (east of Ypres), gave promise of continu



From a painting by Mr. SANDFORD PITT.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

ing to be favourable, yesterday became less settled. The wind steadily increased, and last night and throughout the battle has blown strongly from the west, at times with the force of a gale, and has been accompanied by storms of rain. These adverse conditions added to the difficulties of the advance and to the work of our aviators. Notwithstanding this, our aircraft performed valuable work, and afforded useful information from time to time both regarding the positions of our own troops and the assembly of the enemy for counter-attack.

On the 3rd inst. low clouds and a high west wind made aerial work almost impossible.

In spite of these conditions a little artillery work was carried out, and four of our machines attempted to bomb one of the enemy's aerodromes.

One of these machines reached and bombed its objective, and two succeeded in dropping their bombs on other targets behind the enemy's lines.

Very few hostile aircraft were seen.

One German aeroplane was driven down out of control, and one of our machines is missing.

A later report shows that a seventh hostile machine was brought down on the 2nd inst., in addition to the six already reported.

Oct. 5th., 10 p.m.—On the 4th instant the weather was almost impossible for flying, but, in spite of the rain, low clouds, and exceptionally strong wind, our artillery machines watched our advancing troops and reported their positions and the movements of the enemy.

Some of our fighting scouts flew over and attacked troops, transport, and guns from the air.

One of our machines is missing.

Oct. 6th, 10.1 p.m.—The weather on the 5th instant continued to be unsettled and stormy, and again made flying difficult. Successful artillery work was, nevertheless, accomplished, and many photographs were taken.

Enemy aerodromes in the Lille area were attacked with bombs. Railway stations at Westroosebeke (north-east of Poelcappelle), Iseghem (south-east of Roulers), and Courtrai (east by south of Ypres) were attacked during the day—the latter two were also attacked at night—and over two tons of explosives were dropped.

Enemy aircraft were active in the battle area. Four of his machines were brought down, and three driven down out of control.

Five of our machines are missing.

Oct. 7th, 9.57 p.m.—The weather was still very unfavourable for flying on the 6th inst., but a little artillery work was done. One and a-half tons of bombs were dropped on enemy targets, including a railway station, and our fighting machines went out whenever possible.

One failed to return; a bombing machine is also missing, which went out on the night of Oct. 4th-5th.

Oct. 8th, 10.14 p.m.—There was a short spell of fair weather on the 7th before the heavy rain which fell almost all day. While this lasted considerable work was done by our artillery machines, and our bombing machines dropped over two and a half tons of explosives on Staden and Courtrai (respectively north-east and east of Ypres) railway stations and other targets.

The enemy showed marked activity in the vicinity of our newly-won territory and attacked our bombing machines vigorously. Two hostile machines were brought down and three were driven down out of control.

One of our machines is missing.

War Office Communiqués

Oct. 4th.—The G.O.C. British Forces in Macedonia reports:—

Our aeroplanes have carried out a most successful raid on an extensive scale, bombing the enemy's camps and dumps on the Belashitza Planina (north-west of the Struma Valley).

Hostile troops were scattered by machine-gun fire, and one of several enemy aeroplanes which attacked our formation was brought down near Matnica (north-west of Poroi).

All our machines returned safely.

Oct. 8th.—The G.O.C. the British Forces in Macedonia reports:—On the morning of the 6th we successfully raided Akindzali and Bulamac (east of Lake Doiran). Our aeroplanes co-operated by dropping bombs on the enemy's batteries and engaging his infantry with machine-guns.

Our aircraft have also carried out bombing raids on Ciftlidzik (west of Demir Hissar), where a hostile anti-aircraft gun was put out of action, and on Cestovo (north-west of Lake Doiran), where an ammunition dump was damaged.

Home Command Communiqué

Oct. 2nd, 12.15 p.m.—The latest police reports state that in last night's air raid the casualties in all districts visited by the raiders were:— Killed, 10 Injured, 38.

The Casualty List.

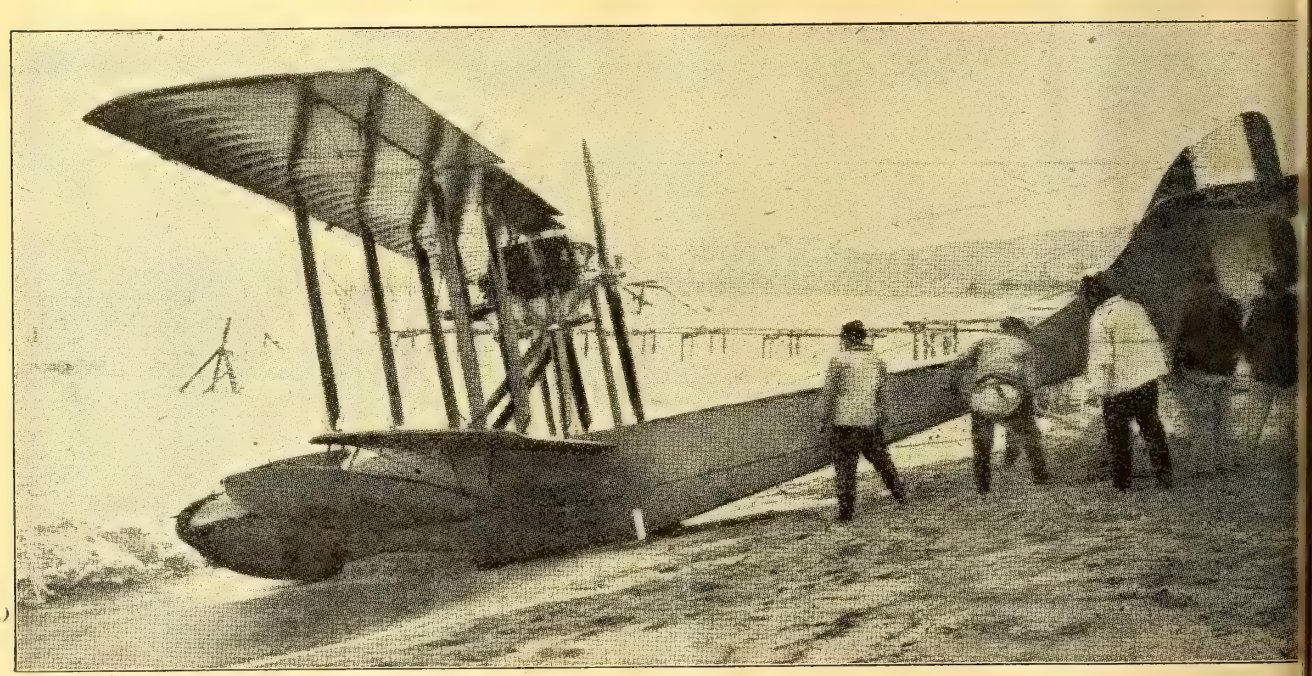
Reported Oct. 3rd.

Killed.—Bailey, Sec. Lt. J. B., E. Yorks R., attd. R.F.C
Gilbert, Sec. Lt. A. H., R.F.C.
MacHaffie, Sec. Lt. J., R F.C.
McKenzie, Sec. Lt. G. W., R.F.C.
McKergow, Sec. Lt. R. D. W., Dn. Gds, attd. R.F.C.
Payne, Sec. Lt. C. McK., R.F.C.
Spurway, Sec. Lt. S. M., R.F.C.
Ward, Maj. G. B., M.C., R.F.C.

Previously reported Missing, now reported Killed.—
Jackson, Sec. Lt. G. W., North'd Fus., attd. R.F.C.

Wounded.—Cain, Sec. Lt. D. W. T., R.F.C.
Layfield, Sec. Lt. H. D., R.F.C.
Smith, Sec. Lt. P. W., Yeo., attd. R.F.C.
Thorowgood, Sec. Lt. L. V., R.F.C.

Missing.—Asher, Sec. Lt. R. S., R.F.C.
Bell, Sec. Lt. E. A., R.F.C.
Browne, Lt. W. A., R. Innis. Fus., attd. R.F.C.
Cooke, Sec. Lt. E. A., R.F.C.
Curtis, Sec. Lt. R. L., R.F.C.
Hatfeild, Capt. A. C., R.F.C.
Inglis, Sec. Lt. R. A., R.F.C.



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Kirby, Sec. Lt. F. W., R.F.C.
Law, Capt. J. K., R. Fus., attd. R.F.C.
McGregor, Sec. Lt. R. R., R. Scots, attd. R.F.C.
McLean, Sec. Lt. T. W., R.F.C.
McRae, Sec. Lt. W. G., R.F.C.
Mills, Capt. R. N. F., A.S.C., attd. R.F.C.
Nowell, Sec. Lt. R. E., R.F.C.
Orr-Ewing, Sec. Lt. A. I., Yeo., attd. R.F.C.
Potts, Lt. W. J., M.C., R.F.A., attd. R.F.C.
Uniacke, Sec. Lt. D. P., FitzG., R. Ir. Rif., attd. R.F.C.

Previously reported Missing, now reported Wounded and Prisoners in German Hands.—Bird, Lt. A. F., Norf. R., attd. R.F.C.
McDonald, Lt. K. W., R.E., attd. R.F.C.

Previously reported Missing, now reported Prisoners in German Hands.—Cullen, Lt. W. D., E. Surr. R., attd. R.F.C.
Sawård, Lt. N. C., R.F.A., attd. R.F.C.
Williams, Lt. S. W., Ess. R., attd. R.F.C.

Correction.—Holman, Sec. Lt. G. C., R.F.C., reported missing, should read—Holman, Lt. G. C., R.F.C.
Reported Oct. 4th.

Wounded.—MacGregor, Sec. Lt. I. C., R.F.C.
Miller, Lt. W. M., Yeo., attd. R.F.C.
Prior, Lt. A. P., S. Staff. R., attd. R.F.C.

Missing.—Whiting, Lt. J. O., R.F.C.

Previously reported Prisoner, now reported Wounded and Prisoner in German Hands.—Coombs, Sec. Lt. V. C., R.F.C.
Reported Oct. 5th.

Killed.—Barlow, Sec. Lt. J. L., R.F.C.
Holdsworth, Sec. Lt. E., R.F.C.

Missing.—Baynton, Sec. Lt. G. R., R.F.C.
Bramley, Sec. Lt. S. L. J., R.F.C.
De Lacey, Sec. Lt. J. M., W. Yorks R., attd. R.F.C
Rothery, Sec. Lt H., R.F.C.

Previously reported Missing, now reported Wounded and Prisoners in German Hands.—Diamond, Sec. Lt. W. E. B., R.F.C.
Harper, Lt. S. A., M.C., Ches. R., attd. R.F.C.
Madge, Lt. J. B. C., R.F.C.
Neill, Lt. J. W. F., R. Scots, attd. R.F.C.
Parkes, Lt. G. A. H., R.F.C.
Quilter, Sec. Lt. E. G. C., R.F.C.
Sharp, Capt C. C., R.F.C.
Spencer, Sec. Lt. W. A. L., R.F.C.
Webster, Sec. Lt. T. M., R.F.C.

Previously reported Missing, now reported Prisoners in German Hands.—Barlow, Sec. Lt. A. N., R.F.C.
Collis, Capt. D. P., R.F.C.
Huggard, Sec. Lt. J. C., R.F.C.
Hume, Sec. Lt. R. C., R.F.C.
McDonald, Lt. H. O., R.F.C.
Pickett, Sec. Lt. A. C., R.F.C.
Scarborough, Sec. Lt. F., R.F.A., attd. R.F.C.
Shipwright, Sec. Lt. A. T. K., R.F.C.
Wigley, Sec. Lt. L., R.F.C.

Corrections.—Previously Reported Missing now Reported Killed.—Bird, Sec. Lt. D. J. de A., R.F.A. and R.F.C. should read—Bird, Lt. D. J. de A., R.F.A. and R.F.C.
Missing—Lloyd, Sec. Lt. E. E. F., Dragoon Gds., attd. R.F.C., should read—Loyd, Sec. Lt. E. E. F., Dragoon Gds., attd. R.F.C.

Indian Force.—Previously unofficially, now officially reported Prisoner in Bulgarian Hands.—Leslie-Moore, Lt. A., I.A.R.O., attd. R.F.C.
Reported Oct. 6th.

Previously reported Missing, now reported Killed.—Margoliouth, Sec. Lt. A. H., Yorks L.I. and R.F.C.
Robertson, Lt. J. R., Yeo. and R.F.C.

Wounded.—Baker, Sec. Lt. P. H., R.F.C.
Macklin, Lt. L. G., Shrops. L.I., attd. R.F.C.
Underhill, Sec. Lt. R. J., R.F.C.

Missing.—English. Sec. Lt. W., R.F.C.
Hall, Sec. Lt. W. E., Lond. R. and R.F.C.
Paton, Lt. D. M., R.F.C.

Previously Reported Missing, now Reported Prisoner in German Hands.—Waters, Lt. C. B., Lond. R., attd. R.F.C.

Correction.—Skelton, Sec. Lt. J. E. J., R.F.C., reported wounded, should read Skelton, Sec. Lt. J. E. L., R.F.C.
Reported Oct. 8th.

Killed.—Worstenholm, Sec. Lt. J., R.F.C.

Previously reported Missing, now reported Killed.—Read, Capt. H. E., Yeo., attd. R.F.C.

Wounded.—Bealey, Sec. Lt. W. F. de V., N. Staff R., attd. R.F.C.
Bushe, Sec. Lt. L. A., R.F.C.
English, Sec. Lt. A. A., M.C., R.E., attd. R.F.C.
Hyde, Lt. W. V., R. Innis. Fus., attd. R.F.C.
McCreary, Lt. F. L., S. Lan. R., attd. R.F.C.

Missing.—Miall-Smith, Lt. G. E., M.C., Norf. R., attd. R.F.C.
Powers, Lt. B. A., Midd'x R., attd. R.F.C.

Canadian Contingent.—Killed.—Menzies Lt. J. A., Cent. Ont. R., attd. R.F.C.
Ryan, Lt. B. W., Can. Eng., attd. R.F.C.

Died of Wounds.—Bevan, Lt. M., Cent. Ont. R., attd. R.F.C.
Bullock-Webster, Lt. F., Can. M.G.C., attd. R.F.C.

Wounded.—Langford, Lt. G. C., Can. F. A., attd. R.F.C.
Wallace, Lt. N. E., Can. F. A., attd. R.F.C.

Missing.—Baillon, Lt. E. N., B.C. R., attd. R.F.C.
Woods, Lt. C. H. C., Can. A.S.C., attd. R.F.C.
Reported Oct. 9th.

Previously reported Missing, now reported Killed.—Pitt, Sec. Lt. B. W., R.F.C.

Wounded.—Grossmith, Sec. Lt. W., R.F.A., attd. R.F.C.
Jones, Lt. W., R.F.C.
Pentland, Sec. Lt. A. A. N., R.F.C.

Missing.—Andrews, Sec. Lt. F. C., R.F.C.
Dennis, Sec. Lt. C. C., Lond. R., attd. R.F.C.
Fenwick, Sec. Lt. T. B., R.F.C.
Gould, Lt. W. H. R., R.F.C.
Lomax, Sec. Lt. C. N. L., R.F.C.
Risteen, Sec. Lt. C. F., R.F.C.
Roberts, Sec. Lt. G. B., R.F.C.
Rouquette, Sec. Lt. D. G., R.F.C.
Stuart, Sec. Lt. C. E., R.F.C.
Sutcliffe, Sec. Lt. A. L., S. Staff. R., attd. R.F.C.
Taylor, Sec. Lt. A., R.F.C.
Thompson, Sec. Lt. H. V., R.F.C.

Previously reported Missing, now reported Prisoners in German Hands.—Barton, Lt. A. E. S. R.F.A., R.F.C.
Leighton, Capt. R. T., Yeo., attd. R.F.C.

Correction.—Previously reported Missing, now reported Killed.—Cruikshank, Capt. G. L., D.S.O., R.F.C., should read:—Cruikshank, Capt. G. L., D.S.O., M.C., Gord. Highrs., attd. R.F.C.

Casualties among Warrant Officers, N.C.O.'s and Men. The dates are those of the official list.

Killed.

Sept. 28th.—R.F.C.—Murphy 38559 2nd Cl. Air Mech. C. W. (Palmer's Green, N.).

Previously Missing, now reported Killed.

Sept. 26th.—R.F.C.—Russell 1130 1st Cl. Air Mech. F. (Brighton).

Died of Wounds.

Sept. 27th.—R.F.C.—Howorth 31241 1st Cl. Air Mech. H. (Crawshawbooth).

Died.

Sept. 24th.—R.F.C.—Samuel 26751 2nd Cl. Air Mech. J. (Wood Green, N.).
Sept. 26th.—Hirst 39859 2nd Cl. Air Mech. A. (Macclesfield).
Sept. 29th.—Harris 49630 1st Cl. Air Mech. R. (West Wycombe).

Wounded.

Sept. 27th.—R.F.C.—Barnes 8212 1st Cl. Air Mech. A. W. (Sandy).
Sept. 28th.—Barras 2723 Cpl. J. C. (Middlesbrough); Jackson 1163 Sjt. C. (Dronfield); Smith 8140 1st Cl. Air Mech. C. W. (Poplar, E.).

Previously reported Missing, now reported Missing, believed Killed.

Sept. 27th.—R.F.C.—Barnes 61925 Sjt. W. A. (Parkhurst); Bonner 1897 1st Cl. Air Mech. P. (Guildford); Carr 65251 Sjt. J. E. (South Shields); Ekins 46133 2nd Cl. Air Mech. A. W. (St. Neots); Gilchrist P/4567 2nd Cl. Air Mech. E. (Whiteabbey); Russell 1130 1st Cl. Air Mech. F. (Brighton); Stewart 3223 Cpl. G. (Dundee); Wood 61869 2nd Cl. Air Mech E. (Coughton).

Previously Missing, now reported by the German Government Died of Wounds.

Sept. 25th.—R.F.C.—Grundy 6709 1st Air Mech. M. A. (Astley).

Australian Imperial Force.

Killed.

Sept. 26th.—A.F.C.—Hayles 765 A. E.

Accidentally Killed.

Sept. 24th.—A.F.C.—Wright 473 F. C.

Wounded.

Sept. 26th.—A.F.C.—Outhred 582 J. C.; Tyers 953 W. C.

PERSONAL NOTICES.

Death.

BALDWIN.—Sjt. Cuthbert Godfrey Baldwin, R.F.C., previously reported missing, now presumed to have been killed in action, was the eldest son of the late Rev. A. G. Baldwin, Vicar of Burnopfield, Durham, and of Mrs. Baldwin, 2, Priory Villas, Friern Barnet, N.11.

(*Continued on page* 1062.)

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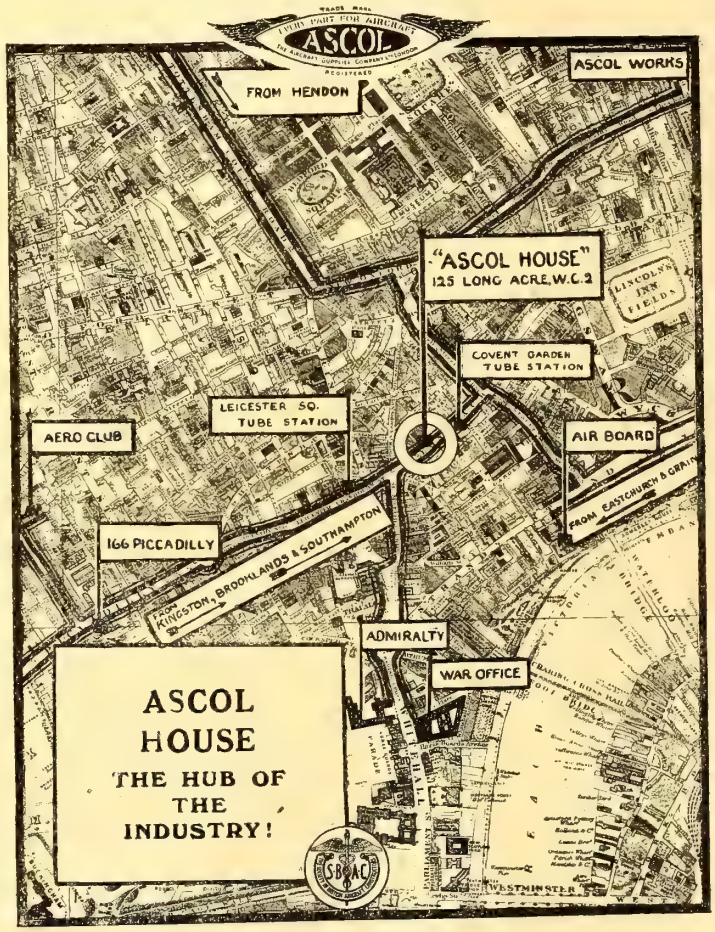
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Fits, Mis-Fits, and Limits Aeronautical.

(Applied to Things Material rather than to Personnel.)

BY V. P. BENEDICT.

Terms of Reference.

To supply enlightenment to the uninitiated on the subject of 'fits" and the "limits" outside of which they become "mis-fits," s the object of the following paragraphs.

For information as to the medical application of the former erm, my readers are referred to any appropriate work on the ubject (or to their medical officer), and the relation of the two atter to official departments is the subject of frequent editorial omment in this journal.

Reference of Terms.

Fits.—This term, fits, has reference to the quality of two or ıore components to assemble together with a greater or lesser egree, either of firmness or workable freeness, according to ıeir relative functions one with the other.

Example.—The function of a crank-shaft demands that it ıall rotate freely in its bearings, therefore, the term "running-t" is applicable to the portions in contact. If the difference in iameter size between them is too great, sloppiness or play esults. Line contact only is obtained, with consequent rapid ear or displacement of the metal under the pressure involved.

If there is too small a difference, they decline to function wing to friction, or if the necessary force is applied to produce otation, something happens—in the case of soft or white-metal earings these may take up the quality of running, but in the ense due to fusion.

Allowances.—To ensure obtaining the desired fit, it is the esigner's part to state the dimensions in which "allowance" made to provide the correct functioning demanded.

The need for an "allowance" may stand explanation. The lea popularly held that a round or other section-piece of given iameter will freely assemble in a hole of corresponding shape nd exactly the same dimensions is fallacious. To get, say, a ne-inch peg into a dead size one-inch hole would be almost as uch some job as would be the making of them to dead accuracy r the measuring of them when made.

So in practice, if it is desired that a part shall assemble freely a given hole, that part is made slightly less in dimension than ıe hole, which is termed making an "allowance."

Tolerances.—The term "allowance" is not to be confused with ıe term "tolerance," this latter being the extent of variation om stated size, which is permissible for errors in workmanship. his is a very necessary provision, even with skilled hands using ıe very best of facilities, and is more obviously essential when rranging the repetition production of aeroplane and engine arts by semi or unskilled labour.

Limits.—"Limits" is a term denoting dimensions in which oth allowance and tolerance are combined.

In application, thus:—Say a shaft is needed one-inch in dia-eter and to be a free running-fit in the corresponding hole. irst, must be allowed a tolerance for error in the hole and a milar tolerance for error in the shaft, while between the nallest diameter thus permitted to the hole and the largest size llowed on the shaft, must be inserted a dimension of allowance r fit.

To illustrate:—The tolerance for a one-inch hole is usually ut at from half-a-thousandth oversize to a quarter-thousandth ndersize, and stated thus:—1 in. plus 0.0005 in., minus 00025 in.; or thus, high, 1.0005 in.; low, 0.99975 in., from hich it is to be understood that the hole size is not to xceed half-a-thousandth over one inch, nor to be under one-inch ss a quarter-thousandth. A total tolerance is thus allowed of three-quarters of a thousandth inch (0.00075 in.). Since it is usual to make allowance on the shaft or male part, the above figures will form the limits for the hole size.

For the shaft—since the hole may be as small as 0.99975 in.—it will be obviously necessary that the largest permissible size be something less than this figure. So here the allowance for fit is inserted, fixing the high limit for the shaft at 0.9995 in., equal to a quarter-thousandth, minimum clearance. Then is allowed the tolerance for error, taken at a further quarter-thousandth, fixing the low limit for shaft diameter at 0.99925 in., and the maximum clearance at one-thousandth of an inch (0.001 in.), which is the difference between 1.00025 in., largest permissible hole, and 0.99925 in., smallest permitted shaft diameter.

Shafts and holes produced within the above limits would be absolutely certain to assemble interchangeably, and to give a nice running-fit, particularly since, in repetition practice, the extremes would seldom meet, and the average difference would, therefore, run about half-a-thousandth.

The extent, both of tolerance and allowance, will, of course, depend on the grade of work to which applied, to the materials used, the machining finish called for, and also to the ratio of length to diameter. In the case of aero-engines and 'plane parts the limits naturally are really fine.

Necessity, the Mother of—Achievement.

Achievements.—In my verdant days, when first introduced to thousandth parts of an inch, I have hazy recollections either of scoffing or marvelling thereat. Now, in the fulness from the ocean of knowledge of my own cup—albeit a small one—I can of petty wisdom's magnanimity appreciate somewhat that, to the lay-mind, it may sound in the regions of the ridiculous to talk of half-thousandths of an inch, let alone to expect the production of parts by unskilled labour to such degrees of fineness.

So to dispel any such fog of delusion, the following review shows how far present-day capacity for minuteness in measurements actually carries.

A one-millionth part of an inch—think of it, a thousandth-part of a thousandth—is, incredible though it may seem, a measurable quantity. Yet is it more amazing than the assay of minute quantities of gold to define the small percentage of base metal contained therein?

Naturally, dimensions in millionths can be handled only by very special scientific gadgets, employed almost solely in checking microscopic work for such uses as astronomical instruments, where an error of a thousandth might mean the devil to pay, by causing a couple of planets to collide—on paper.

The method employed is based on the wave length of certain kinds of light, and on what is known as the interruption thereof, and is so costly in time and apparatus as to be clean out of court for practical application even to so specialised an industry as the construction of aeroplanes.

Ten times a millionth—a one-hundred-thousandth—still well in the realms of the minute, is, nevertheless, within the capacity of a special mechanical measuring device used in many of the larger and better equipped works for checking sizes of accurate gauges.

Describable broadly as a glorified micrometer—an instrument with which every worker in metal for aircraft ought to be reasonably familiar—the machine consists of a frame with a gap, into which projects the end of a fine pitch screw carrying a fairly large wheel calibrated round the rim to read minute portions of a turn.

The piece to be measured is laid in the gap against the side opposite to the screw, which is then brought into contact by turning the wheel. Each complete turn is a fortieth-part of an inch, and the rim is divided into 250 parts, so that each represents a ten-thousandth part of an inch. By means of a vernier rule attached, one-tenth of this can be read off, equalling hundred-thousandths.

A similar machine graduated in millimetres has a finer pitch-screw and reads to a ten-thousandth part of a mm., equal to only four one-millionths of an inch (approximately).

Measuring Ten-Thousandths.

So by tenths one comes to ten-thousandths, actually the finest degree likely to be called for, and then only for the most important of gauge work. And even gauges are seldom tied to a closer tolerance than from two to four ten-thousandths, according to size and application.

Micrometers are made provided with vernier rules to give readings in ten-thousandths of an inch, but even if accurate to this degree when brand new, it is doubtful if they are to be sworn to after a few weeks' wear, particularly since very delicate touch would be needed to adjust the screw every time to exactly the same tension. Such vernier micrometers have, of course, their uses in fixing divisions less than a thousandth nearer to the mark than would be possible by judgment and eyesight otherwise guided.

In thousandths and half-thousandths parts of an inch run the general limits for the finest production work—measurements which, in view of preceding remarks, might almost be called coarse. They are, in fact, sufficiently broad to permit of being attained by semi-skilled labour on repetition production, but per contra they are fine enough to demand the most ingenious and perfected of manufacturing appliances backed by the keenest supervision through the medium of what is known as the Limit Gauge System, to be described in a later issue.

Necessity the Mother.

Since even things abstract have, or should have, in war-time particularly, a sole object in utility, one is moved to inquire into the very genuine necessity, shown by the results of many years' practice, and the studied conclusions based thereon by leading experts, to obtain for these—to the unfamiliar, keen—standards of measurements.

Take a ¼-in. or ⅜-in. diameter pin, of which dozens are used on every aeroplane for swivels, fork ends, valve-rocking levers, and similar, where a free working fit without wobble or play is necessary. Here—if the hole is accurate, as it should be—half a thousandth undersize in the pin will give a nice easy working fit, while a second half-thousandth would mean absolute sloppiness, with corresponding short life, owing to rapid and uneven wear. Oppositely, if the pin were not a half a thousandth under the hole size, it would only assemble to give a tight fit, or possibly would not go together at all without persuasion of the four-pound hammer type.

To view the importance of accuracy in running or sliding-fits in correct perspective, it needs be borne in mind that the play or sloppiness—albeit in itself, and for its own sake, objectionable—is none the less but an outward manifestation of a deeper and more potent ill.

In an efficient and long-lived bearing it is essential that the surfaces of contact be as wide an arc of the full circle as possible. Theoretically, the load should be spread over the full half-circle divided by the line of load, thus to distribute the load over as much area as possible, and also to ensure that essential smooth sliding action between the rotating portion and its bearing round a centre common to both

Where there is much negative difference in size between the shaft and hole, the surface of contact is limited to a fine line (modified somewhat by enlargement due to elasticity of the metals which compress under stress), and thus the whole load is concentrated over a small area with consequent rapid wear in the direction of the load.

Where the direction or extent of the thrust is not constant, wear occurs unevenly in different places, with the result that the centre of resistance jumps about and fails to correspond to the centre of load, setting up friction and torsions which—if nothing worse—detract from efficiency.

An example of inconstant load is found in the bearings—big and small ends—of a connecting-rod. Any car or motor-cycle owner knows (probably from experience) that only a few thousandths of play resulting from wear are needed to generate "Ford music," while, on the other hand, the least sign of tightness may set up enough friction in the bearings and between the pistons and cylinder-walls to knock 50 per cent. off the revolving capabilities of the engine.

And the loss of efficiency from a long crankshaft distorting when its bearings wear out of alignment needs to be experienced to be appreciated, but is understandable, given a conception of the amount of energy expended in bending what is probably a two-inch section of high tensile, hardened and toughened steel, some thousand or two times per minute, even if the deflection is only an infinitesimal fraction of an inch.

Which is some of the difference between a rolling Ford (Ford drivers will appreciate), and a Rolls-Royce, and the same is partly why aeroplanes are not, as yet, a proposition for the million.

Uniformity Essential.

To get on with the Agenda. Consider the necessity for accuracy, as established on the score of working efficiency alone, and quite apart from the all-important phase interchangeability, take reams unwritten as read, or for granted, and let us back to the straight and strict path from which all this divergence is perhaps but journalistic trapping, designed to make printable length of facts dry in their fewness and compactness. If therein is anything educative or informative of your charity write it down rather to blind chance than to malice aforethought.

Obviously, to work accurately for efficiency and interchangeability implies strict uniformity of practice, since one man's measure must prove no man's poison, and, as perchance, a shaft turned in Brummagem may, under the stress of war, meet in Baghdad introduction with a hole fra' Lancasheer ("If yer knows a better 'ole," etc.), we must have some consistent basis on which all tolerances and allowances are framed.

Although not universally used, nor in agreement with the findings of the Engineering Standards Committee, who, however, have not yet gone very far with this particular question, such basis exists in the Tables known as Newall's Standards, which are *officially approved for aero-construction purposes.*

Any drawing which calls for fits under the lettering x, y, z, or as 1st, 2nd, or 3rd grade, for force-driving or push-fits, or for holes Class A or B, grade 1 or 2, may, unless the contrary is definitely stated thereon, be taken as based on Newall's Table.

These tables provide for tolerances in producing holes of size up to 12 in., and specify the limits—covering allowances and tolerances—to be applied in producing shafts to give any desired fit.

Dimensioned in both English and Metric measures, these tables will be found printed on the next page of this article, and, in addition, is given a very useful list of tolerances for various purposes in aero-construction, such as are not covered by the term Fits.

Not Hard and Fast.

The Newall Standards are not intended to be arbitrary, but need be read in conjunction with a fair amount of "common savvy," in so much as they are subject to modification according to (a) the ratio of length to diameter; (b) materials to which applied; and (c) machining finish called for.

As instance (a) if the length of bearing is excessively short equal, say, to three-fourths the diameter, the limits given for Z or 1st grade shaft will allow a quite free fit, whereas in a very long bearing the same freeness would demand quality Y, which is giving slightly more allowance.

Instance, again, illustrating b and c in fixing allowance for a driving fit, where both the shaft and the hole are to be ground in steel or cast-iron, much closer figures can be used than where, say, a plain turned-finish steel shaft or bush is to be forced into an aluminium casting.

The factor of length ratio is further important from the very general aptitude of long shafts—particularly if hardened—to take on a set or to warp after being machined, due to internal stresses existing in all materials and liable to cause distortion particularly after removal of portions of the metal in machining.

Metal "Seasons" like Wood.

So positive is this liability to change of form, that in producing a really accurate and fine piece of work, say for scientific purposes, or even very high grade machine tool beds and shafts it is essential practice to give a "seasoning" period of from a few days to several months, after each removal of metal, and thus to allow the structure to settle down.

THE TABLES OF LIMITS REVIEWED.

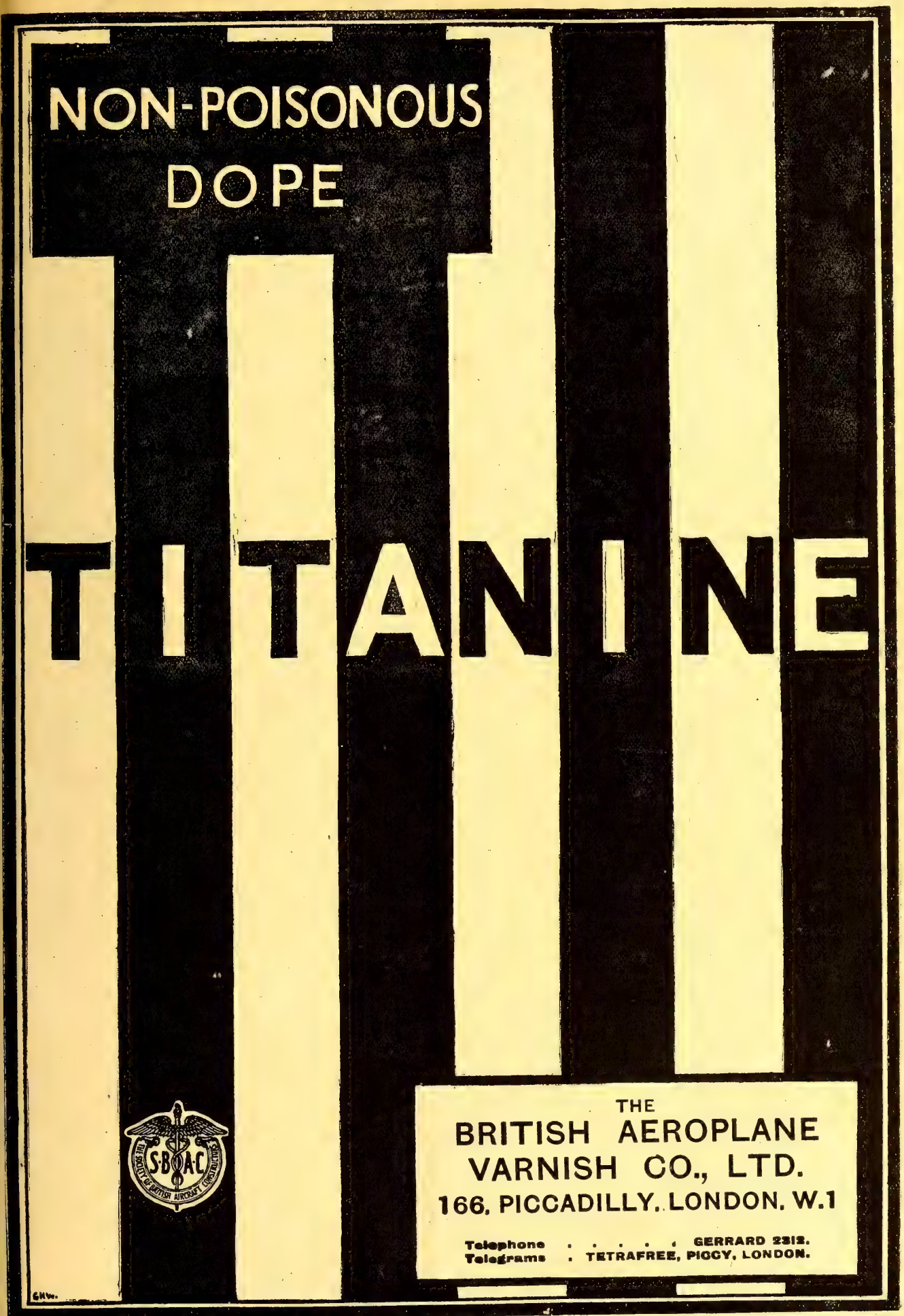
As a final preliminary to the tables, and to assist in the proper application, attention is directed in the following paragraphs to the essential features and points to be noted.

HOLES.

The first subject covered is tolerance for error in standard holes, with a schedule of differences from given sizes which are permissible in work of acceptable accuracy. The term "Standard Holes" implies working to given size as near as is commercially practicable.

This is of primary importance for the reason that the basis of interchangeability is strict uniformity in the size of the hole, leaving all allowances for fit to be made on the shaft or counterpart.

The why and the wherefore being that in repetition work holes can be finished by means of reamers, or, like cutting tools, to very close standard of accuracy, and uniform as to size with a very narrow margin. If the tools are reasonably well made and used with ordinary care, they will reproduce with amazing



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ENGLISH—Figured in *Thousandths* of an inch and fractions thereof.

NEWALL'S STANDARDS.

TABLE OF LIMITS (Tolerances and Allowances).

METRIC—Figured in decima of a millimetre.

	ENGLISH.	Dia. in ins.	0—½"	9/16"—1"	1 1/16"—2"	2 1/16"—3"	3 1/16"—4"	4 1/16"—5"	5 1/16"—6"	6 1/16"—7"	7 1/16"—8"	8 1/16"—9"	9 1/16"—10"	10 1/16"—11"	11 1/16"—12"
HOLES.	Class "A"—First Grade	+	1/4	1/2	3/4	1	1	1	1 1/2	1 1/2	1 3/4	1 3/4	1 3/4	2	2
		—	1/4	1/4	1/4	1/2	1/2	1/2	1/2	3/4	3/4	1	1	1	1
	Class "B"—Second Grade	+	1/2	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/4	2 1/2	2 1/2	2 3/4	2 3/4
		—	1/2	1/2	1/2	3/4	3/4	3/4	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/2
FITS.	Force Fit ..	+	1	2	4	6	8	10	12	14	16	18	20	22	24
		+	1/2	1 1/2	3	4 1/2	6	8	10	12	14	16	18	20	22
	Driving Fit ..	+	1/2	1	1 1/2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6	6 1/2	7
		+	1/4	3/4	1	1 1/2	2	2 1/2	3	3	3 1/2	4	4 1/2	4 1/2	5
	Push Fit ..	—	1/4	1/4	1/4	1/2	1/2	1/2	1/2	1/2	1/2	1/2	3/4	3/4	3/4
		—	3/4	3/4	3/4	1	1	1	1	1 1/4	1 1/2	1 1/2	2	2	2
RUNNING FITS.	Class "X"—Third Grade	—	1	1 1/4	1 3/4	2	2 1/2	3	3 1/2	3 1/2	3 1/2	3 3/4	4	4	4 1/4
		—	2	2 3/4	3 1/2	4 1/4	5	5 3/4	6 1/2	6 3/4	7	7 1/2	8	8 1/4	8 1/2
	Class "Y"—Second Grade	—	3/4	1	1 1/4	1 1/2	2	2 1/4	2 1/2	2 3/4	2 3/4	3	3 1/4	3 1/4	3 1/2
		—	1 3/4	2	2 1/2	3	3 1/2	4	4 1/2	4 3/4	5	5 1/2	5 3/4	6	6 1/4
	Class "Z"—First Grade	—	1/2	3/4	3/4	1	1	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	1 3/4	1 3/4
		—	3/4	1 1/4	1 1/2	2	2 1/4	2 3/4	2 3/4	2 3/4	3	3	3 1/4	3 1/2	3 1/2

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	METRIC.	Dia. in mm.	0—15	16—25	26—50	51—75	76—100	101—125	126—150	151—175	176—200	201—225	226—250	251—275	276—300
HOLES.	Class "A"—First Grade	+	.007	.013	.019	.026	.026	.026	.039	.039	.044	.044	.044	.051	.051
		—	.007	.007	.007	.013	.013	.013	.013	.019	.022	.025	.025	.025	.025
	Class "B"—Second Grade	+	.013	.019	.026	.032	.039	.045	.051	.057	.057	.063	.063	.070	.070
		—	.013	.013	.013	.019	.019	.019	.026	.026	.032	.032	.032	.032	.038
FITS.	Force Fit ..	+	.026	.051	.102	.153	.204	.255	.306	.358	.410	.462	.514	.566	.618
		+	.013	.038	.077	.115	.152	.203	.254	.306	.358	.410	.462	.514	.566
	Driving Fit. .	+	.013	.026	.039	.064	.077	.089	.102	.114	.127	.140	.152	.165	.178
		+	.007	.019	.026	.039	.051	.063	.076	.076	.089	.102	.114	.114	.127
	Push Fit ..	—	.006	.006	.006	.012	.012	.012	.012	.013	.013	.013	.019	.019	.019
		—	.019	.019	.019	.026	.026	.026	.026	.032	.038	.038	.051	.051	.051
RUNNING FITS.	Class "X"—Third Grade	—	.025	.032	.045	.051	.063	.076	.089	.089	.089	.095	.102	.102	.108
		—	.051	.070	.090	.108	.127	.146	.165	.171	.179	.191	.203	.210	.216
	Class "Y"—Second Grade	—	.019	.025	.032	.038	.051	.057	.063	.070	.070	.076	.083	.083	.089
		—	.032	.051	.064	.076	.089	.101	.114	.121	.127	.140	.147	.152	.158
	Class "Z"—First Grade	—	.012	.019	.019	.025	.025	.032	.032	.032	.038	.038	.038	.044	.044
		—	.019	.032	.039	.051	.057	.064	.070	.070	.076	.076	.083	.089	.089

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little variation in size, particularly as they are usually reserved for finishing light cuts after the bulk of the stock has been removed by drilling, punching, or boring. The surface-finish of a reamered hole should be beautifully smooth and even.

Taking the hole size as basis for uniformity is considered preferable, chiefly from the economy point of view, as outside diameters usually are produced on machines with adjustable cutting tools, thus enabling any desired size to be set up with a facility depending only on the fineness of the working tolerance allowed. Whereas to make variations in half-thousandths in hole sizes—particularly small ones—would entail a multiplicity of reamers with the resultant vast increase in equipment costs.

Newall gives two sets of tolerances called A and B, or 1st and 2nd grade. First grade holes are invariably used where good fits either running, push or sliding are required, and the second grade applies to holes of less primary importance where the accuracy is less essential, and permits advantage to be taken of the much cheaper production made possible by even a small widening of the tolerances.

Class A holes will be found necessary on all engine-bearings, con-rod big and small ends, gudgeon-pin bushes, valve and valve tappet, and push-rod guides, oil, water and air-pump cylinders, and for shaft holes in gears and sprockets, whether for running free, or to be keyed to shaft.

Second Grade or B holes occur where the working fit is less primary in importance, as example, swivels, forks, levers and pulleys for controls, hinges and sockets, and all places where the rotary of sliding motion is not constant or wide in extent. Also they are generally permitted for sockets and recesses where the function is simply accurately to position the part inserted, as in the case of cylinder-seats, crankcases, and inspection covers, tube, lugs, and clips, etc.

SHAFTS.

Provision is made for six different shaft-fits—graded from force-fits needing hydraulic or similar presses to assemble, down to quite free running or sliding allowance.

Force-Fits.

Shafts to the limits under this heading are intended for permanent assembly. They require to be driven home under heavy pressure, or shrunk on by heating the female portion to expand the hole size while the cold shaft is inserted, after which the contraction consequent upon cooling creates a solid binding grip between the two.

Permanence of joint is such, owing to the pressures involved, that in a short time the metals take on a set under the compression which generally makes it impossible to separate the parts without incurring the absolute destruction of one or the other.

Force-fits are seldom met with in aero construction, but belong more particularly to the heavier engineering trades—railway and shipbuilding.

Driving-Fits.

A considerably less intimate connection is here provided, but, nevertheless, such requires force to assemble, usually applied by a light screw press. It can be done between the centres of a lathe using the back centre screw to apply the push—but not advisable if the foreman is about, nor if it happens to be your own working lathe. Also, it is frequently accomplished with a "coaxer" or mallet, another method crude and unjustifiable—unless nobody of importance happens to be around. (Second A.M.'s please note.)

A driving-fit is intended for application to bushes for bearings, valve and tappet guide insertion, pipe flanges, and such jobs, giving a permanent joint in the sense that they can only be dissembled by force, and at the risk of destroying the binding effect when the two are re-assembled.

Caution Needed.

Driving-fits provide an example where careful judgment must be exercised in applying the limits to differing materials. The allowance on a gun-metal bush to ensure permanent fixture in an aluminium casing will need to be slightly in excess of the figure given, and per contra, will be reduced somewhat in the case of a hardened steel bush or pin to be inserted in an iron casting.

Push-Fits.

Push-fits are used mostly in conjunction with provision for such things as bolts, setpins, split rings, or cotter pins for fixing in position, and for ease of detachment. They are applied where no motion—rotary or sliding—is needed, and are called for usually with Class B holes, on cylinder-seats, detachable valve housings, covers, plugs and fillers, ball-bearing housings and shafts, keyed shafts, pipe flanges, and sockets, all where the chief function is to position. Also, they are used on tube clips, lugs and sockets, for welding or brazing in position, and on hinge and fork and pins.

As implied by the description the fit intended is one which can be easily pushed home but is not free enough to allow rotation at any speed or free sliding.

Running-Fits.

Allowances to provide three grades of coarseness in running-fits are given. Here, again, judgment is called for, since the tables must be applied with due regard to various factors. Have careful regard to length ratio, running speed intended, machining finish, and materials used. Also, and this is important, where there is liability to change of temperature, allow for expansion and contraction.

Classes Y and Z are those most frequently called for, and generally Z, being the finest grade, is used in conjunction with holes Class A. Y is used much on engines where heating up occurs, and also on shafts of secondary importance, and where very little relative motion is needed.

And a Final Explanation.

For the reason, probably, that English micrometers are so calibrated, it has somehow come to be usual to visualise fine measurements in thousandths of an inch, and to refer to quarter, half, and three-quarter thousandths, instead of using fifth and sixth decimal places which, of course, is the strictly academic method.

Obviously, it is easier to appreciate a quarter of a thousandth than its decimal equivalent of 25 one hundred thousandths (.00025 in.). Even the most precise and exacting would automatically call it two and a half ten-thousandths—nought but a compromise, and, as such, with advantage, to be avoided.

All of which is to be read in the explanatory vein, neither apologetic nor yet that excusing which accuses, for since this journal never was, is not, nor, fervently one hopes, ever will be, hide-bound by precedent, the Tables—unconfused by noughts—are printed with all the English limits dimensioned in thousandths of an inch, and quarter, half, and three-quarter thousandths.

And if departing thus from well-trodden paths makes for economy of printers' time and of ink, this virtue is, indeed, its own reward, but lest advantage lie all on the one side, you readers are made free of the clarity achieved thereby. For, of certainty, it is well to be rid when possible of noughts and dots—stand they in solitary state or massed in serried ranks. Which remarks, *naturellement*, imply no disdain on my part for the two noughts which invariably figure on my weekly salary cheque.—(£0 os. 9d.—Ed.)

USEFUL MEMORANDA OF TOLERANCES OTHER THAN FOR FITS.

The following notes apply only where definite limits are not specified :—

Bolt and Screw Holes, Diameter of.—Provided sufficiently large freely to accommodate the size of bolt or screw called for, a few thousandths of an inch are not important. The usual practice is to drill either 1/64th or 1/32 in. larger than bolt size. Many drawings call for holes to one or the other of these two dimensions. Thus, a hole for ¼-in. bolt may be definitely dimensioned 17/64ths or 9/32nds. If it be simply specified "hole for ¼-in. bolt," either of these two drills would suit. Over about ½-in. or ⅝-in., allow the 1/32nd clearance.

Being unimportant, it is sufficient simply to drill or punch, reamering being unnecessary.

Bolt Screw, etc., Holes, Distance between.—Tolerances are not usually here stated, but an error can generally be allowed equal to the clearance in the hole diameter. Thus, if this is 1/32, the same amount, either over or under in the distance between, would just permit of assembly.

Care must be exercised, where there are more than two holes, not to get a progressive error as, if several holes in a straight run were each 1/32nd over or under in distance from the neighbouring ones, the total error between extremes would be considerable.

Holes for Rivets.—It is usually correct to use a drill of the same diameter as the rivet specified. The small error usual in drilled holes will not be detrimental.

Holes, other than already provided for.—Such as lightening holes should be kept to size or about 0.004 in. *under*. It is always preferable to work undersize, thus permitting correction by enlarging if objection should be taken.

Machined diameters.—The standard tolerance on external diameters is up to 0.004 in. oversize.

Machined lengths and thicknesses.—If machined all over these are acceptable from size to plus 0.004 in. If machined one side only—and the other left rough—allow tolerance oversize up to 4 or 5 per cent of drawing figure provided the excess will not interfere with assembly. In this latter case it is probable that limits are given on drawing—anyway, they ought to be—and if there be any possible doubt, I advise referring the point to someone with authority to decide it.

Casting and forging dimensions.—Where not to be machined the thicknesses may be up to 8 or 10 per cent. oversize.

Washers, plain, for Bolts, Studs and Screws.—Hole same tolerance as for bolt holes. Thickness allow plus or minus

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from 0.003 to 0.008 in., according whether light or heavy section. Outside diameter, plus or minus 1/32nd or 0.030 in.

Bolt, Stud, or Screw Shanks, diameter of.—Plain portion from nominal size up to plus 0.004 in.

Bolt, Stud and Screw Shanks, length.—Size to plus 0.030 in. in the shorter ones up to, say, 2 in.; over, allow up to 0.050 in.

Bolt Head and Hexagon Nuts.—Width across flats plus or minus 0.003 in. to 0.005 in., according to size. Generally governed by the error in dimension of the bar stock used. Thickness, plus up to 0.010 in. in small sizes, say, to 5/16 in. tapped. Over this, up to 0.020 plus.

Radius round Holes, in pressed work or machined parts, such as Eyebolts, Sockets, Clips, etc.—Tolerance depends somewhat on that allowed in the hole. Should always be kept on the full side by more than half the hole tolerance taken. Usually designed to leave a width of metal surrounding the hole equal to or slightly exceeding hole diameter.

Thickness of Sheet-metal parts.—Tolerance governed by thickness of metal used, and should be acceptable at from 0.002 in. to 0.004 in. undersize, or 0.004 in. to 0.008 in. over. Error on plus side always safest.

Tube, outside diameter.—If limit unspecified should be within 0.001 in., up or down, for each ¼in. of diameter up to 1 in. Over this size a further 0.001 in. for each succeeding half inch.

Internal diameter should follow within 0.002 in., the error occurring in outside diameter, thus limiting error in wall thickness to this amount. In tubes over 16 or 18 gauge the error allowed may be up to 0.003 in.—V. P. B.

The Production of Aeroplanes and their Components

(Sixteenth Instalment.)

BY STEPNEY BLAKENEY.

Having dealt with the construction of many metal parts necessary for the construction of aircraft, and possibly sufficiently to enable those new to the Industry to gain some insight, one may as well next deal with the finishing up of the various parts of the machine.

These important component parts may be dealt with in the following order, namely, the centre-section plane, the top and bottom main planes and ailerons, the tail plane and elevators, the fin and the rudder and fuselage.

The Centre Section.

The centre plane being of wood, it will be sent to the paint and varnishing department, where it will receive (subject to this system being adopted by the management) two coats of spirit-varnish all over, then the small riblets and rib-noses will be covered top and bottom sides by a strip of half-inch India tape, glued on, the total length of which will be about 2 ft. 3 in. for each length of tape.

As soon as the glue is dry and set, the top and bottom edges of all parts, forming the centre plane, will receive one good coat of white dope-resisting paint, as will all fittings, tie rods, wiring plates, bolts and nuts. The centre plane will then be ready for inspection by the A.I.D.

The same process applies to the main planes, tail planes, elevators, fins and rudders, with regard to the white dope-resisting coat of paint. Of course, spirit-varnish is not put on steel-tube constructions, which are only painted with the dope-resisting paint.

Covering.

This work of painting having been carefully completed, these parts will be sent to the covering shop.

The centre plane is the first member to be covered. During the time the covering department has been waiting for these various components to come along it has been busy cutting out and machining up the covers, and putting the small eyelets for laces into the covers, and many other small jobs.

A Word of Warning.

Here I pause to point out a word of warning. Before attempting to fit on and stretch the covers taut and sew up, take care to see that the linen fabric is absolutely dry and well-aired. Unless you can be fully satisfied regarding this point, stop covering until you have taken the necessary steps to dry and air the fabric.

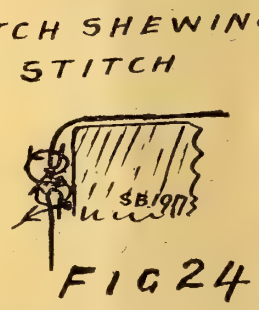
The reason for this is that however little percentage of dampness or moisture the fabric may contain it will be contracted in area, and however tight it may be stretched and sewn on, it will relax and become quite slack on coming in contact with the warm, dry air of the dope room. It is fairly safe to say that no amount of doping will succeed in bringing up the tautness of the fabric as it is required for first-class wings, and the finished article will be a disappointment.

Putting on the Fabric.

In covering the wings it is usual to put on the covers over the leading edge. Stretch the cover over the top and bottom of the ribs, then stretch the fabric to the trailing edge and tack down with a few fine gimp pins. Sometimes this is done with pins. The fabric should then be stretched lengthways and all seams straightened from the front to the back.

After which the two surplus ends of the fabric should be cut off, leaving only about half an inch of each end to turn in and make a seam. The sewing up of the seam may then be commenced.

The first stitch should be made by passing the needle through the fabric from the inside, pulling it through and passing over the edge, then across the gap to the fabric on the top of the wing. Here the needle is again passed from the inside of the fabric to the outside, and the stitches both drawn together (see Fig. 24). This has the effect of neatly and tightly drawing together the ends of the fabric.



Stringing.

The wing will now have to go through the process of "stringing." This consists of putting a loop of string over the fabric and round each rib, and knotting and carrying the end of the string about four inches farthur on and repeating the same operation. This is done to each rib, on which there will be about eight to nine loops.

This is for the purpose of attaching the fabric to the ribs, preventing the fabric ripping, and generally helping to distribute the load. The lines of string are afterwards covered with strips of fabric, with frayed edges, to give a neat, smooth and strong surface.

Doping.

The wing will now be ready for doping, and will be taken to the dope room. Before commencing doping the temperature of the room must be at least about 70 deg. Farenheit. This temperature is asked for not for the purpose of causing the contractor trouble and annoyance and the expense of putting in and maintaining a heating apparatus, but for the purpose of obtaining satisfactory results with the dope employed, namely, good adhesion, a smooth surface, and what may possibly appeal to the contractor, rapid production.

This remark specially applies to the coat of aeroplane varnish which is applied to the underside of the wings, as some makes of varnish will take seven to eight hours to dry and sometimes longer, and with a good temperature it is easy to save half an hour, which means a lot to the contractor whose space is limited, and thereby output is increased.

Doping Wings.

The wing which has to be doped can be laid on some trestles made a convenient height, say about 2 ft. 9 in. On these will be laid or fixed pieces of wood about the same length as the spars and the wing-spars will rest on these and nowhere else. Taking the weight these will prevent the fabric from being strained, and possibly punctured.

The dope will now be put into a can capable of holding, say about a quart, and with a narrow slot in the top like a letter-box slit, through which to put the brush. A brush about 4 in. wide should be used to spread the dope.

In putting on the dope it is necessary to put it on, and especially to spread it, quickly and evenly. Take plenty on the brush and work it evenly into the fabric backwards and forwards, and then finish by working it at right-angles to your last way of spreading. Then leave it to dry thoroughly before attempting the next operation.

In doping it may be as well to go to the trouble of instructing the dope hands that to dope a wing properly they should not attempt to start on about half-a-dozen spots at once, they must start at one end and work first of all on a small patch of, say, 2 ft. by 1 ft. 6 in., and finish this before starting elsewhere. By this means it may be possible to get an equal quantity of dope all over the wing, and not patches of dope as is frequently the case with inexperienced hands, who do not know any better, and occasionally who don't think. Some are honest enough



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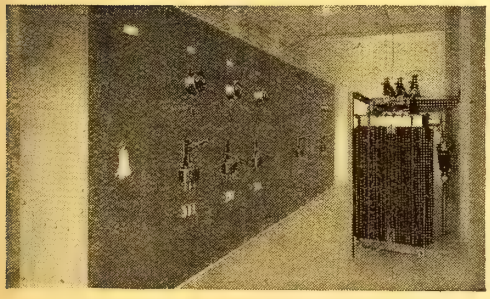


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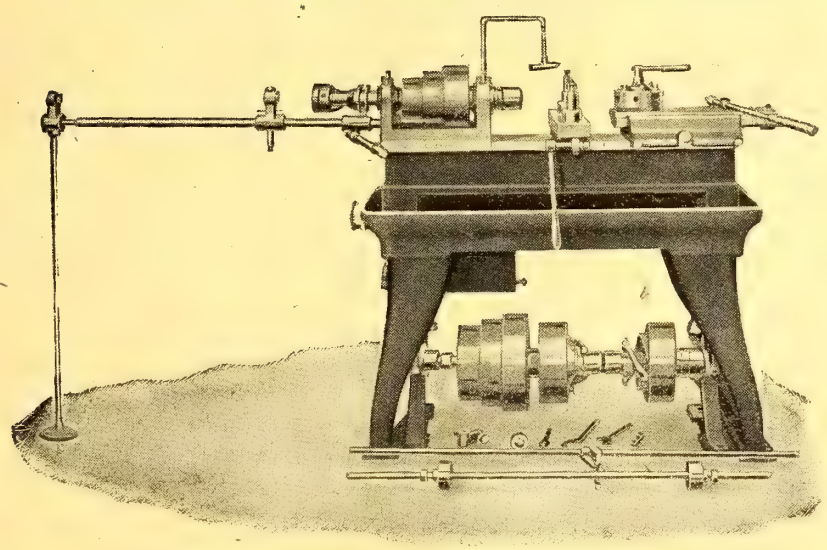
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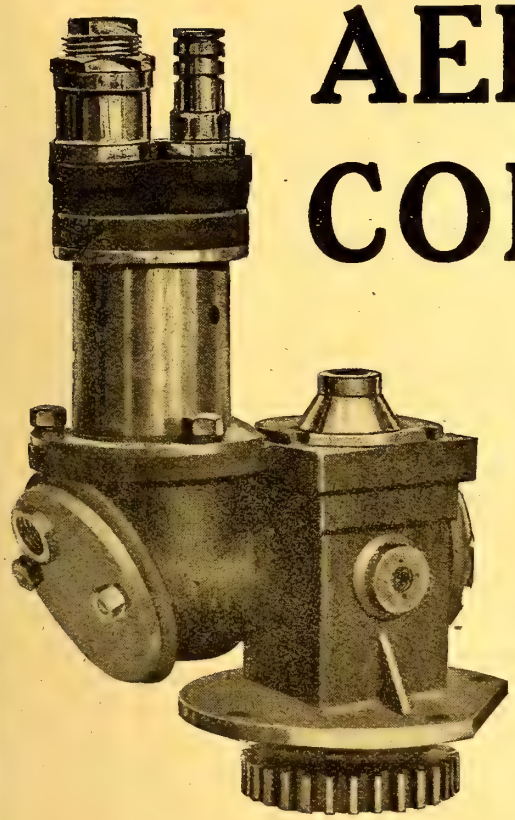
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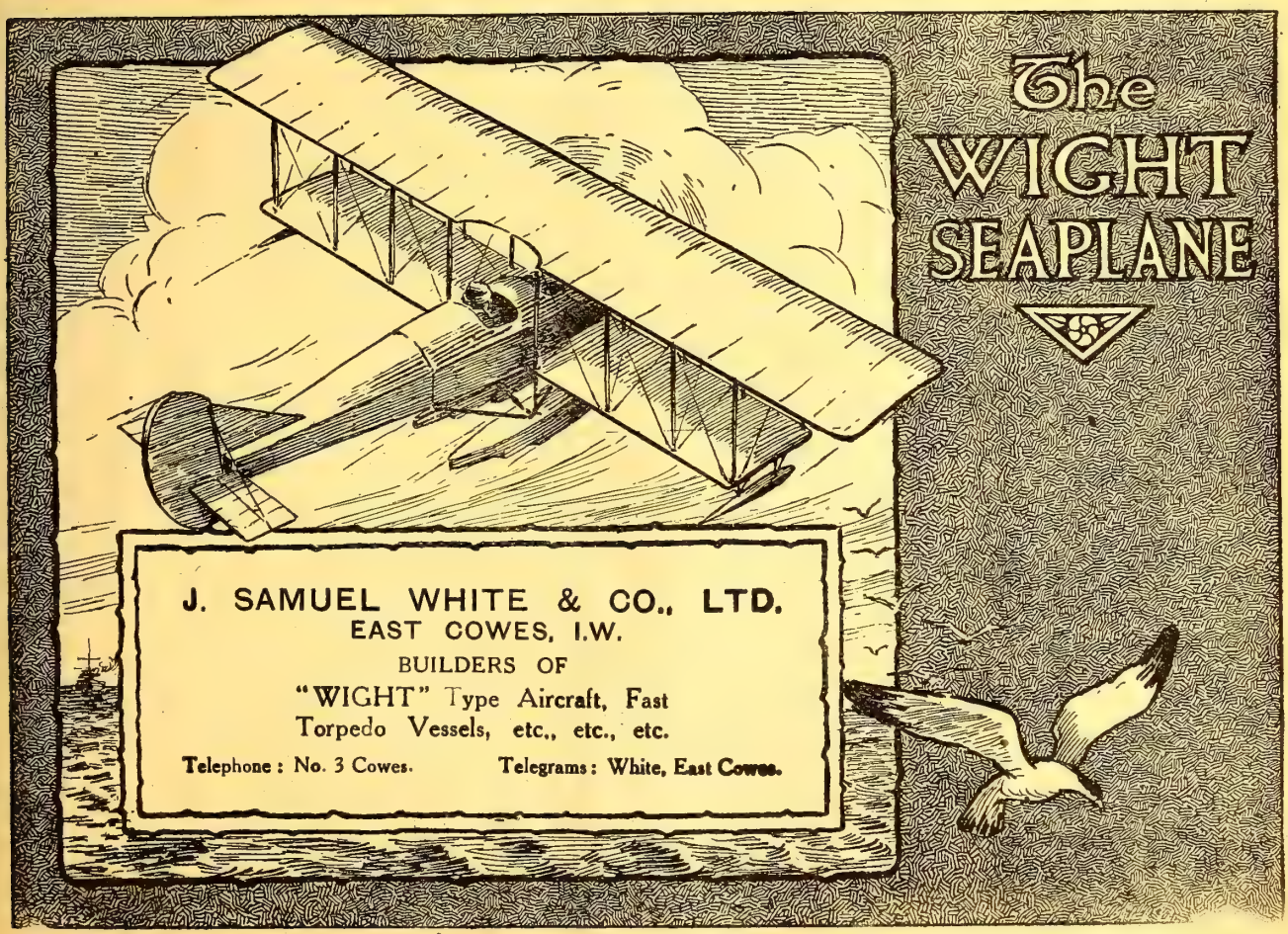
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Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6.

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Robinson & Cleaver, Ltd., Regent Street, London, W.1. Gerrard 1070.

Component Parts—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (4 lines).

B. D. V. Aircraft Spares, Syon Chambers, 161, Kew Road, Richmond, Surrey. "Aeros, Richmond." Richmond 1681.

Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6. Hampstead, 4728.

The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aercracons, Canning, London." East 1300.

The Osborne Aircraft Co., Ltd., Whin Hill, Greenock, Scotland. "Cordage, Greenock." Greenock 618.

Cords, Tapes, and Threads—

MacLennan, J., & Co., 30. Newgate Street, E.C.1. And at Glasgow. City 3115.

Dopes—

British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312.

British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellutate, London." Regent 4046.

Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawb, London." London Wall 5359-3622.

Clark, Robert, Ingham & Co., Ltd., Caxton House, S.W.1. "Pearline, Vic, London." Victoria 2923.

Electrical Accessories—

Mann, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston road, London." Museum 70.

Premier Electric Heaters, Ltd., 258, 259, and 360, Bradford Street, Birmingham. "Fahrenheit, Birmingham." Midland 081.

The Edison Swan Electric Co., Ltd., Ponder's End, Middlesex. "Ediswan, Enfield." Enfield 520 (6 lines).

Electric Cables—

E. Kalker & Co., Coventry. "Kalker, Coventry." Coventry 24x.

Engines and Parts—

Allen, W. H., Son & Co., Ltd., Queen's gineering Works, Bedford. "Pump, ford." Bedford No

Arrol-Johnston, Ltd., Dumfries. "Mocar, D fries." Dumfries 281

The Beatty School of Flying, Ltd., The Br way, Cricklewood, N.W.2. Hampstead

Beardmore Aero Eng., Ltd., 112, Great land Street, W.1. "Beardmore, Lond Gerrard

Dudbridge Iron Works, Ltd. (Salmson), Victoria Street, London S.W.1. "A flight, Vic, London." Vic

Gordon Watney & Co., Ltd., Weybri "Mercédès, Weybridge." Weybridge 550 (7 li

Green Engine Co., Ltd., Twickenham. Richmond

Gwynnes, Ltd., Hammersmith Iron W Hammersmith, W. "Gwynne, Ham smith." Hammersmith

Rolls-Royce, Ltd., 14 and 15, Conduit St., "Rolhead, London." Gerrard 1654

The Selsdon Aero & Engineering Co., Imperial House, Kingsway, W.C.2. Regent

Sturtevant, B. F., Co.. Ltd., Hyde Park, Bo U.S.A.

Sunbeam Motor Car Co., Ltd., Wolverham "Moorfield, Wolverhampton." Wolverhampton

The Gnôme & Le Rhône Engine Co., 47, Victoria Street, S.W. "Eleven London." Walthamstow 408 (2 li

Willans & Robinson, Ltd., Victoria W Rugby. "Willans, Rugby." Rugby 112 (3 li

Flexible Shafts—

Herbert Terry & Sons, Ltd., Redd "Springs, Redditch." Redditch

Flying Schools—

Bournemouth Aviation Co., Ltd., Talbot lage, Bournemouth. "Etches, Winton. Bournemouth

Cambridge School of Flying & Aerodrome Ltd., 30b, St. Andrews Street, Cambr

Furniture (Office)—

Cookes (Finsbury), Ltd., Finsbury Pave House, London, E.C.2. London Wall 573 and

Galvanising—

Boulton & Paul, Ltd., Rose Lane W Norwich. "Aviation, Norwich." Norwich

Cowper-Coles Manufacturing Co., Sunbur Thames. Sunbury

Gears—

Moss Gear Co., Ltd., Thomas Street, A Birmingham. "Mosgear, Birmingham

Glue—

East

Improved Liquid Glues Co., Ltd., Gt. He tage Street, E. (Croid.). "Excro Wapp, London." Avenue

Mending Co., 5, Arthur Street, E.C. Bank

Goggles—

Triplex Safety Glass Co., Ltd., 1, Alben Street, Piccadilly, W.1. "Shatterlys, P London." Regent

Heating and Ventilating—

Comyn, Ching & Co., Ltd, Castle Street, Acre, W.C. "Comyn, Ching, West London." Gerard 1077 (3 li

Chas. P. Kinnell & Co., Ltd., 65 & Southwark Street, London, S.E.1. "Kin London." Hop 372 (2 li

Instruments—

British Wright Co., Ltd., 33, Chancery L W.C.2. Holborn

Instruments (Scientific, A meters, etc.)—

Short & Mason, Ltd., Macdonald R Walthamstow, E.17. "Aneroid, Ph London." Walthamstow

Machine Tools—

Brewster & Co., 11, Queen Victoria St E.C.4. "Circumfuse, Cannon, London City

Magneto Driving Pieces—

Herbert Terry & Sons, Ltd., Redd "Springs, Redditch." Redditch

Magnetos—

The M-L Magneto Syndicate, Ltd., Vic Works, Coventry. "Corlton, Coventry Coventry 1008-

The British Lighting & Ignition Co., 204, Tottenham Court Road, W.1. "V mag, Phone, London." Museum

Metal Manufacturers—

Clifford, Chas., & Sons, Ltd., Birmingl "Clifford, Birmingham." Central 4

Metals in General—

Samuel Mercer & Co., 198. Upper Tha Street, E.C.4. "Reconciled Cannon, don." City

Pritt & Co., 46, Fenchurch Street, Lon E.C.3. "Poetry, Fen, London." Avenue 995, 996, and

BUYERS' GUIDE.

tal Parts and Fittings—
ccles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
ircraft Supplies Co., Ltd., 17, John Street, Theobald's Road, W.C. "Upcast, Holb, London." Holborn 858.
rnott & Harrison, Ltd., Hythe Road, Willesden Junction. Willesden 2297.
ayliss, Jones & Bayliss, Ltd., Wolverhampton. (Bolts and Nuts.) "Bayliss, Wolverhampton." Wolverhampton 1041.
he Birmingham Guild, Ltd., 45, Gt. Charles Street, Birmingham. "Handicraft." Central 3705.
lackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk, Bham." Central 550.
he British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow, London. "Golshel, Hounslow." Hounslow 254.
lann, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston road, London." Museum 70.
lountford, Fredk., Ltd., Fremo Works, Lifford, Birmingham "Fremo, Birmingham." Kings Norton 261.
ubery, Owen, & Co., Ltd., Darlaston. "Roofs, Darlaston." Darlaston 87.
ankey, Joseph, & Sons, Ltd., Wellington, Shropshire. "Sankey, Wellington, Salop." Wellington 66.
he Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.
he Aircraft Construction Co., Harlev Works, Beckton Road, E.16. "Aercracons. Canning, London" East 1300.
hompson Bros., Ltd., Bradley, Bilston. "Thomoson Bros., Bilston." Bilston 10.
Vooler Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10.

tal Shearing Tools—
lontgomery, Smith, & Co., Ltd., Tangent Works, Keynsham, near Bristol. "Ingenuity, Saltford." Keynsham 21.

tal Spinnings—
abriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

tric Bolts—
ashmore Bros., Zota Works, Hildreth Street, Balham, S.W. Battersea 415.
ubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

scellaneous—
nderson, D., & Son, Ltd. (Roofs), Belfast. "Anderson, Belfast." Belfast 4033-4034-4035.
nti-Glare Glass Co., Ltd., 76, Turnmill Street, E.C. Central 3731.
owden Wire, Ltd., Willesden Junction, "Bowirelim, Harles, London." Willesden 2400 (3 lines).
rown Bros., Ltd., Great Eastern Street, E.C.1. "Imbrowned, Bethroad, London." London Wall 6300.
dison Swan Electric Co., Ponder's End. (Lamps.) "Ediswan, Enfield." Enfield 520 (6 lines).
ndolithic Manufacturing Co., Ltd., 61½, Fore Street, London, E.C.2. Labels in Metal, Ivory, Ivorine, etc.
erbert Frood Co., Ltd., Chapel-en-le-Frith. "Frodobrake, Birmingham." Central 793.
lasso Manufacturing Co., Ltd., 211, City Road, E.C. City 9558.
ondon Label Co., Ltd., Harley Works, Beckton Road E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.
acLennan, J., & Co., 30, Newgate Street, E.C.1., and at Glasgow. Tapes, Cords and Threads. City 3115.

otor Cars—
rrol Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.
ann, Egerton & Co., Ltd., 379/381, Euston Road, London, N.W.1. "Manegecar, Eusroad, London." Museum 70.
tandard Motor Car Co., Coventry. "Flywheel, Coventry." Coventry 530 (4 lines).

ameplates and Labels—
ndolithic Manufacturing Co., Ltd., 61½, Fore Street, London, E.C.2.
he Clegg Metal Engraving Co., Chatsworth Works, Worthing. "Clegg Worthing."

bservation Panels—
riplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

atent Agents—
King's Patent Agency, 165, Queen Victoria Street, E.C.4. Central 682.
Page & Rowlingson, 27, Chancery Lane, E.C.4. Central 332.
Stanley Popplewell & Co., 38, Chancery Lane, W.C.2. Central 1763.

etrol Storage (Bulk)—
Bywater & Co. (The Hydraulic System), Craven House, Kingsway, London, W.C.2. "Bywaterist, London." Gerrard 2220.

Piston Rings—
British Chuck & Piston Ring Co., Coventry. "Rings, Coventry." Coventry 723.

Power Presses and Dies—
Bliss, E. W., & Co., 2a, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon, London." Hop 4340.

Presswork—
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.
Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.
Integral Propeller Co., Ltd. "Aviprop, Hyde, London." Hendon 9. Kingsbury 104.
Lang Propeller, Ltd., Weybridge. "Aerosticks, Weybridge." Weybridge 520-521.
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich" Norwich 482 (4 lines).
Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 291, Leeds.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

Rigging for Aircraft—
Cradock, G., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466.

"Royal Ediswan Half-Watt Type Lamps"—
The Edison Swan Electric Co., Ltd., Ponder's End, Middlesex. "Ediswan, Enfield."

Safety Belts— Enfield 520 (6 lines).
Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.

Sand and Die Castings—
Coan, R. W., 219, Goswell Road, London, E.C. "Krankases, Isling, London." City 3846.

Scientific Instruments—
The Foster Instrument Co., Letchworth, Herts. "Instrument, Leeds." Chapeltown 474.

Seaplane Manufacturers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay, 345 (3 lines).
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.
Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton." Southampton 1337.

Seats for Aeroplanes—
Bowser, E., Art Cane Works, 50 Park Lane, Leeds. Central 3437.

Shackles—
The British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow. "Golshel, Hounslow." Hounslow 254.

Sheet Metal Pressings—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 497 Birmingham.
Nicholls & Lewis, Ltd., 16, Princep Street, Birmingham. "Colpressed, Birmingham." Central 7188.
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

Sheet Metal Work—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.

Shock Absorbers (Elastic Cord)—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough."

Sparking Plugs— Peterborough 128.
Forward Motor Co., Summer Row, Birmingham. Central 6259.
Hobson Manufacturing Co., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.
Lodge Sparking Plug Co., Ltd., Rugby. "Igniter, Rugby." Rugby 235.
Ripault, Leo, & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758.

Springs—
Dart Spring Co., West Bromwich. "Dart. West Bromwich." West Bromwich 322.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Steel—
Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237.
Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham." Smithwick 224.

Steel Tension Wires—
Cradock, G., & Co., Ltd., Wakefield. "Cradock, Wakefield." Wakefield 466 (3 lines).

Steel Tubes for Aeroplanes—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Taper Pins—
Mountford, Fredk. (Birmingham), Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262.

Tapes and Smallwares—
MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow City 3115.
James North Hardy & Son, Ltd., 54, Portland Street, Manchester. "Hardson, Manchester." Central 6471.

Timber—
Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Entikosil, Vic, London." Victoria 5073, 4210.
Brown, R. F., & F. W., Wollaton Saw Mills, near Nottingham. "Brown's Saw Mills, Wollaton." Nottingham 1526.
J. Owen & Sons, Ltd., 199a, Borough High Street, S.E.1. "Bucheron, London." Hop 3811 (2 lines).

Time Recorders—
Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310.

Turnbuckles—
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

Tyres and Wheels—
The Beldam Tyre Co., Ltd., Brentford, Middlesex. "Beldam Tyres, Brentford." Ealing 125-126.
The Palmer Tyre, Ltd., Shaftesbury Avenue. "Tyricord, Weskent." Gerrard 1214 (4 lines).

Varnishes—
Clark, R. Ingham, & Co., Caxton House, S.W.1. "Pearline, Vic, London." Victoria 2923.
Harland, W., & Son, Merton, London, S.W.19. "Harland, Wimbledon 45." Wimbledon 45 and 1395.
Naylor Bros., Ltd., Southall, Middlesex. "Naylor, Southall." Southall 30.

Washers—
Herbert Terry & Sons, Ltd. Redditch. "Springs, Redditch." Redditch 61.

Watchmakers and Jewellers (Silver Models)—
Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 9091 (3 lines).

Welding Repairs—
Barimar, Ltd., 10, Poland Street, W.1. "Barimar, Reg, London." Gerrard 8173.

Wind Shields—
Auster, Ltd., 133, Long Acre, W.C. "Winflector, London." Regent 5910.
London Label Co., Ltd., Hadley Works, Beckton Road, E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Wires and Cables (Aeroplanes)—
Bruntons, Musselburgh, Scotland. "Wiremill, Musselburgh." Musselburgh 28.
Cradock, Geo., & Co., Ltd., Wakefield. "Cradock, Wakefield." Wakefield 466 (3 lines).

Wirework—
Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Woodworking Machinery—
Robinson, Thomas, & Son, Ltd., Railway Works, Rochdale. "Robinson, Rochdale." Rochdale 467.
Sagar, J., & Co., Ltd., Halifax. "Sawtooth, Halifax." Halifax 136.
Wadkin & Co., Leicester. "Woodworker, Leicester." Leicester 7611.

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Acetylene Welding Plant—
Imperial Light, Ltd., 123, Victoria St., S.W. "Edibras, Phone, London." Victoria 3540.

Aeroplane Manufacturers—
Aircraft Manufacturing Co., Ltd., Hendon. "Airmanship, Hyde, London." Kingsbury 180.
Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne." Gosforth 500.
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich "Aviation, Norwich." Norwich 851.
British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol." Bristol 3096.
British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudroplan, Crickle, London." Hampstead 5551.
Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6. Hampstead 4728.
Davidson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1144-1145
Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1176.
Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 120.
Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophid, Crickle, London." Hampstead 7420.
Mann, Egerton & Co., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
Martinsyde, Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge." Woking 331; Byfleet 171.
National Aircraft Co., Ltd., 15, Hackney Road, N.E.2. London Wall 6725.
"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London." Willesden 2455.
Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48.
The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis, London." Putney 2240-2241.
Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester." City 8530-8531, Manchester.
Sage, Frederick & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes." Cowes 193.
Short Bros., Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London." Regent 378.
Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston." Kingston 744.
Standard Aircraft Manufacturing Co., Effingham House, Arundel Street, W.C.2. "Gunsignrush, Estrand, London." City 89.
Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickerfixta, Knights, London." Kensington 6810.
Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil" Yeovil 129.
White J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes." Cowes 3.

Airships—
Airships, Ltd., High Street, Merton. Wimbledon 1314.
Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, 'Phone, London." Regent 378.

Aluminium Castings—
Coan, R. W., 219, Goswell Road, London, E.C.1 "Krankases, Isling, London." City 7846.

Aluminium Presswork (Stampings, Etc.)—
Willans & Robinson, Ltd., Victoria Works, Rugby. "Willans, Rugby." Rugby 112 (3 lines).

Bearings (Etonia Cast Phosphor Bronze)—
Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3927.

Brass Sheets for Tipping Propellers—
Lucraft, H., & Co., 147, Fenchurch Street, London, E.C.3. "Lucraftia, London." Avenue 2217.
Pritt & Co., 46, Penchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 995, 996, and 7006.

Buildings—
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation Norwich." Norwich 851.
Fairby Construction Co., Ltd., 117, Victoria Street, S.W.1. "Bizfibild, London." Victoria 8868.
Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
The Willley Co., Ltd., Salisbury House, London Wall, E.C.2. "Wrathless, Phone, London." City 2681-2

Cable Coverings and Cable Controls—
Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Capstan Work—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Carburettors—
Hobson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.

Castings—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Lucraft, H., & Co., 147, Fenchurch Street, London, E.C.3. "Lucraftia, London." Avenue 2217.

Castings (Aluminium, Brass, Bronze, Machined or Rough)—
Coan, R. W., 219, Goswell Road, London, E.C.1. "Krankases, Isling, London." City 7846.
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham." Central 1223.
Willans & Robinson, Ltd., Victoria Works, Rugby. "Willans, Rugby." Rugby 112 (3 lines).

Cellon—
Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawb, London." London Wall 5359-3622.

Celluloid (Non-Flam.)—
Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7.
London Label Co., Beckton Road, E.16. "Lonlabel, Canning, London." East 1300.

Clothing—
Burberry's, Ltd., Haymarket, S.W.1. Regent 2165.
Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6.
Hazel & Co., 4, Princes Street, Hanover Square, W.1. Mayfair 4071-2.
Robinson & Cleaver, Ltd., Regent Street, London, W.1. Gerrard 1070.

Component Parts—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (4 lines).
B. D. V. Aircraft Spares, Syon Chambers, 161, Kew Road, Richmond, Surrey. "Aeros, Richmond." Richmond 1681.
Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6. Hampstead, 4728.
The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aerocranes, Canning, London." East 1300.
The Osborne Aircraft Co., Ltd., Whin Hill, Greenock, Scotland. "Cordage, Greenock." Greenock 618.

Cords, Tapes, and Threads—
MacLennan, J., & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.

Dopes—
British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312.
British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellutate, London." Regent 4046.
Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawb, London." London Wall 5359-3622.
Clark, Robert, Ingham & Co., Ltd., Caxton House, S.W.1. "Pearline, Vic, London." Victoria 2923.

Electrical Accessories—
Mann, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston road, London." Museum 70.
Premier Electric Heaters, Ltd., 258, 259, and 360, Bradford Street, Birmingham. "Fahrenheit, Birmingham." Midland 981.
The Edison Swan Electric Co., Ltd., Ponder's End, Middlesex. "Ediswan, Enfield." Enfield 520 (6 lines).

Electric Cables—
E. Kalker & Co., Coventry. "Kalker, Coventry." Coventry 241.

Engines and Parts—
Allen, W. H., Son & Co., Ltd., Engineering Works, Bedford. "Bedford."
Arrol-Johnston, Ltd., Dumfries. "Mocar, fries."
The Beatty School of Flying, Dunfries way, Cricklewood, N.W.2. "Beatty, Cricklewood, London."
Beardmore Aero Eng., Ltd., 113, Hampstead Street, W.1. "Beardmore,
Dudbridge Iron Works, Ltd., Victoria Street, London S.W.1. flight, Vic, London."
Gordon Watney & Co., Ltd., "Mercédès, Weybridge."
Green Engine Co., Ltd., Twickenham.
Gwynnes, Ltd., Hammersmith, Hammersmith, W. "Gwynnes, smith."
Rolls-Royce, Ltd., 14 and 15, Conduit "Rolhead, London."
The Selson Aero & Engineering Co., Imperial House, Kingsway, W.C.
Sturtevant, B. F., Co., Ltd., Hyde Park U.S.A.
Sunbeam Motor Car Co., Ltd., Wolverhampton. "Moorfield, Wolverhampton."
The Gnôme & Le Rhône Engine Co., 47, Victoria Street, S.W. London." Walthamstow
Willans & Robinson, Ltd., Victoria Rugby. "Willans, Rugby."

Flexible Shafts—
Herbert Terry & Sons, Ltd., "Springs, Redditch."

Flying Schools—
Bournemouth Aviation Co., Ltd., Tuition Sheds, Bournemouth. "Etches, Bournemouth."
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Cowper-Coles Manufacturing Co., Sutton Thames.

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Moss Gear Co., Ltd., Thomas Street, Birmingham. "Mosgear, Birmingham."

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Instruments—
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Instruments (Scientific, meters, etc.)—
Short & Mason, Ltd., Maple Walthamstow, E.17. "Ascot, London." Walthamstow

Machine Tools—
Brewster & Co., 11, Queen Victoria E.C.4. "Circumfuse, Cannon,

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Magnetos—
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The British Lighting & Ignition Co., 204, Tottenham Court Road, W. "Magneto, Phone, London."

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Pritt & Co., 46, Fenchurch Street, E.C.3. "Poetry, Fen, London." Avenue 995, 996

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The Birmingham Guild, Ltd., 45, Gt. Charles Street, Birmingham. "Handicraft." Central 3705.
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W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk, Bham." Central 550.
The British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow, London. "Golshel, Hounslow." Hounslow 254.
Mann, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston road, London." Museum 70.
Mountford, Fredk., Ltd., Fremo Works, Lifford, Birmingham "Fremo, Birmingham." Kings Norton 261.
Rubery, Owen, & Co., Ltd., Darlaston, "Roofs, Darlaston." Darlaston 87.
Sankey, Joseph, & Sons, Ltd., Wellington, Shropshire. "Sankey, Wellington, Salop." Wellington 66.
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.
The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aerocranes, Canning, London." East 1300.
Thompson Bros., Ltd., Bradley, Bilston. "Thompson Bros., Bilston." Bilston 10.
Wooler Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10.

Metal Shearing Tools—
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Miscellaneous—
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Page & Rowlingson, 27, Chancery Lane, E.C.4. Central 332.
Stanley Popplewell & Co., 38, Chancery Lane, W.C.2. Central 1763.

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Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

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Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
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Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.
Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton." Southampton 1337.

Seats for Aeroplanes—
Bowser, E., Art Cane Works, 50 Park Lane, Leeds. Central 3437.

Shackles—
The British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow. "Golshel, Hounslow." Hounslow 254.

Sheet Metal Pressings—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
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Tyres and Wheels—
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The Palmer Tyre, Ltd., Shaftesbury Avenue. "Tyricord, Weskent." Gerrard 1214 (4 lines).

Varnishes—
Clark, R. Ingham, & Co., Caxton House, S.W.1. "Pearline, Vic, London." Victoria 2923.
Harland, W., & Son, Merton, London, S.W.19. "Harland, Wimbledon 45." Wimbledon 45 and 1395.
Naylor Bros., Ltd., Southall, Middlesex. "Naylor, Southall." Southall 30.

Washers—
Herbert Terry & Sons, Ltd. Redditch. "Springs, Redditch." Redditch 61.

Watchmakers and Jewellers (Silver Models)—
Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 9091 (3 lines).

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Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Wires and Cables (Aeroplanes)—
Bruntons, Musselburgh, Scotland. "Wiremill, Musselburgh." Musselburgh 28.
Cradock, Geo., & Co., Ltd., Wakefield. "Cradock, Wakefield." Wakefield 466 (3 lines).

Wirework—
Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

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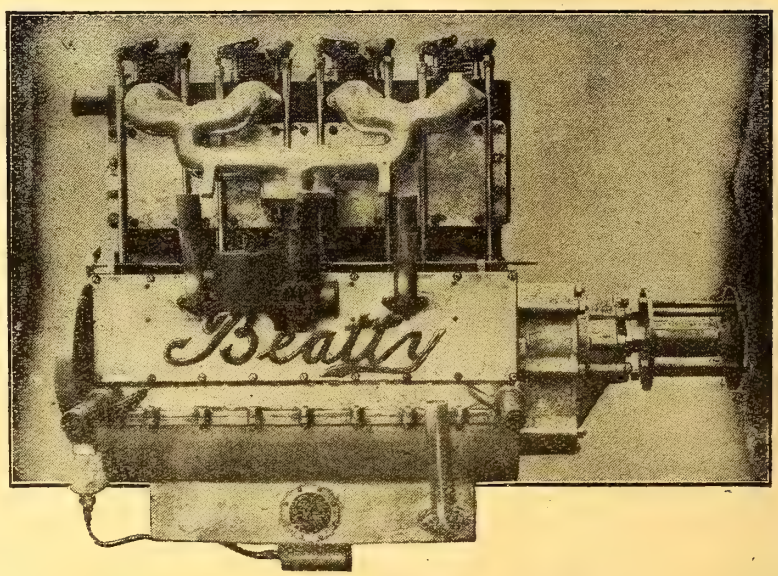
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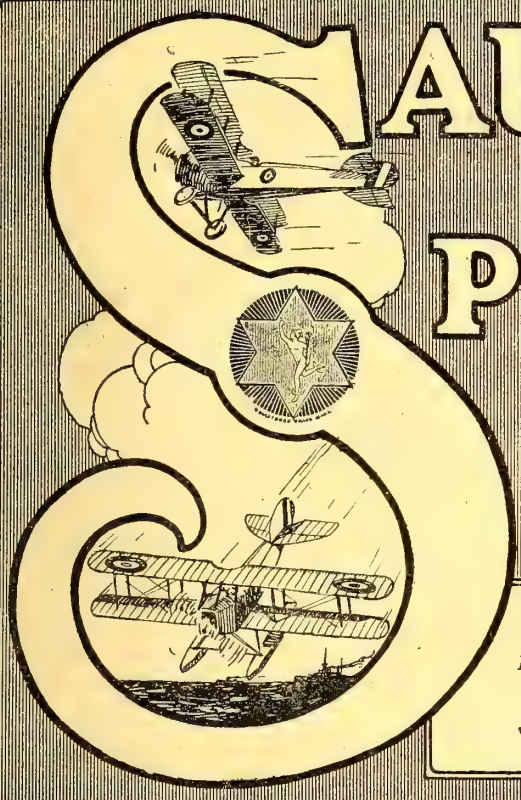
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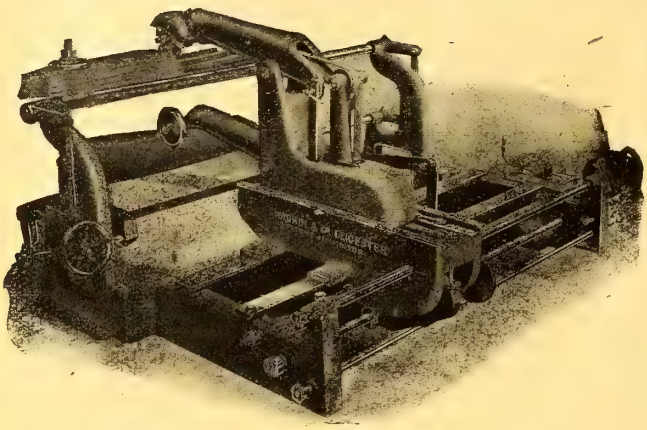
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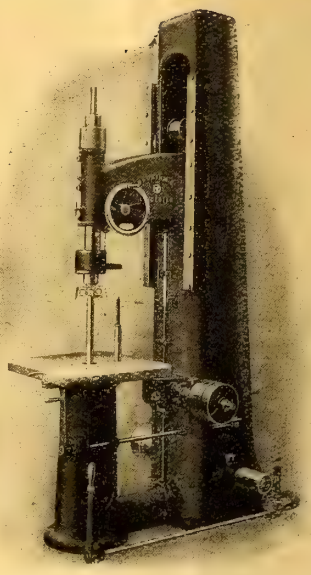
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to tell you so, as I have frequently heard them say, "I don't think." I do appreciate their honesty, although it is a trifle annoying to those holding responsible positions.

Frayed Fabric.

Having completed the first coat of dope, the next thing to do is to obtain the frayed fabric or "spaced" fabric from the stores. This is ordinary fabric of ordinary width, in which the threads called the "weft," namely, those which run longitudinally in the fabric, are left out about every two inches for a width of about half an inch. This is cut into strips and laid on over the rib-stringing and well doped down, also strips are laid along the edges for the purpose of strengthening the fabric and preventing it tearing.

The method of attaching this frayed fabric is to dope the surface well and take a length with both hands. Lay it against the dope surface, or on it, and then rub it well down, either with the fingers or a piece of fabric. Then well dope over it with a brush.

When this has well set, the final coats of dope may be applied.

Identification Marks.

The next thing to do is to set out the identification mark according to the instructions and official measurements given; this is painted on by a painter with some experience in sign-writing or fine work.

When this is dry the "kahki" pigment is put on the top of the wing. Generally two coats are necessary. This being dry, the wing is turned over and given the final coats of varnish and left to dry.

When dry the wings, with the ailerons and the tail plane, the elevators, fin and rudder, which have been doped, will be taken to the finishing shop to have the external fittings attached.

(To be continued.)

THE PRODUCTION OF AEROPLANES.

Sir,—While appreciating your footnote that Mr. Stepney Blakeney's articles on "The Production of Aeroplanes and their Components" are of a somewhat elementary nature, may I be permitted to slightly criticise some parts of his thirteenth instalment. The author in detailing his method of machining tail-skid fittings commences his operations by sending the stamping to the marking-table, afterwards centring, then turning down to dimensions on drawing.

The tail-skid fittings are stampings, hence they will be sufficiently uniform to be chucked in the lathe without marking-off, and have both outside diameters and inside bores finished in one operation, thus saving centring and the time and jig for boring as a separate operation. By this method you will also be sure of having your inside and outside diameters concentric, which I venture to say is almost impossible on the jig Mr. Blakeney shows for boring without accurate fitting of the outside profile.

Again, would it not be better to have the double-eye end of the skid-fitting stamped out, thereby reducing the amount of metal to be removed and lessening the work your cutters have to do? The dies could be made this way with very little extra work. Mr. Blakeney also states the cutters should be well tightened up to prevent them slipping; would not the cutting of a keyway in the cutters be a better method? I would suggest that the stampings should be drilled before the edges are milled, the holes could then be used for a mandrel and N.G.S. template, the stamping being placed on the mandrel and milled to template on profiling machine or revolving-table.

Newcastle-on-Tyne, Sept. 27th, 1917. (Signed) T. Welsh.

Mr. Blakeney's Reply.

Sir,—In reply to Mr. T. Welsh's criticism, I regret I cannot agree that stampings are uniform, as it is no uncommon thing amongst them to find a few that require special adjustment in machining to enable them to be utilised, hence the precaution of sending same to the marking-off table.

With regard to fork-ends being solid, as assumed by Mr. T. Welsh, I think he will generally find, if he examines these stampings, that the fork-ends are stamped out as he proposes. I don't remember having seen a solid one.—S. B.

A NEW DOPE WORKS.

The new London works of the British Aeroplane Varnish Co., Ltd., at Booth Road, Colin Deep Lane, Hendon, N.W.9, are now in full swing. The works are under the management of Dr. P. Ewart Bowles, and Mr. E. Gordon Davies, F.I.C., is the chief chemist. Orders for Titanine and other materials used in connection with Titanine doping schemes can now be delivered promptly throughout the South of England by road or rail. The firm's extensive works at Felling-on-Tyne continue to supply orders required in Northern counties.

One views the progress of Titanine with all the more satisfaction when one remembers that the British Aeroplane Varnish Co., Ltd., was the pioneer firm for the manufacture of dopes which do not dope the workers. The importance of this point was kept by them before the authorities, despite adverse prejudice, and at the present time no aeroplane varnish is employed by the Government whose ingredients are a menace to human life.

THE AMERICAN "LIBERTY" ENGINE.

The successful completion of the U.S.A. or Liberty aircraft engine was announced in an official statement issued by the Secretary of War on August 12th. The statement reads:

"The United States aviation engine has passed its final tests. They were successful and gratifying. The new engine, designated by the Signal Service as the 'Liberty engine,' is now the main reliance of the United States in the rapid production in large numbers of high-powered battle planes for service in the war. In power, speed, serviceability and minimum weight the new engine invites comparison with the best that the European war has produced.

"I regard the invention and rapid development of this engine as one of the really big accomplishments of the United States since its entry into the war. The engine was brought about through the co-operation of more than a score of engineers, who pooled their skill and trade secrets in the war emergency, working with the encouragement of the Aircraft Production Board, the War Department and the Bureau of Standards.

"The story of the production of this engine is a remarkable one. Probably the war has produced no greater single achievement.

"One of the first problems which confronted the War Department and the Aircraft Production Board after the declaration of hostilities was to produce a dependable engine. Two courses were open. One was to encourage manufacturers to develop their own types, the other to bring the best of all types together and develop a standard.

"The necessity for speed and quantity of production resulted in a choice of the latter course, and a standard engine became our engineering objective.

"Two of the best engineers in the country, who had never before seen each other, were brought together at Washington, and the problem of producing an all-American engine at the earliest possible moment was presented to them. Their first conference, on June 3rd, lasted from the afternoon until half-past two o'clock in the morning.

"These two engineers were figuratively locked in a room in a Washington hotel and charged with the development of an aeroplane engine for use by Amercian aviators over the battle-fields of Europe. For five days neither man left the suite of rooms engaged for them. Consulting engineers and draughtsmen from various sections of the country were brought to Washington to assist them. The work in the draughting room proceeded continuously, day and night. Each of the two engineers in immediate charge of engine development alternately worked a twenty-four hour shift.

"An inspiring feature of this work was the aid rendered by consulting engineers and motor manufacturers, who gave up their trade secrets under the emergency of war needs. Realising that the new design would be a Government design and no firm or individual would reap selfish benefit because of its making, the motor manufacturers patriotically revealed their trade secrets and made available trade processes of great commercial value. These industries have also contributed the services of approximately 200 of their best draughtsmen.

"The two engineers locked together in a hotel room in this city promised the Government, if given an opportunity, they would design a satisfactory aero-engine before a working model could be brought from Europe.

"A remarkable American engine was actually produced three weeks before any model could have been brought from Europe. It was promised that this engine would be developed before the Fourth of July. Twenty-eight days after the drawings were started the new engine was set up. This was on July 3rd.

"In order to have the engine in Washington and in actual running order at the nation's capital on Independence Day the perfected engine was sent from a Western city in a special express car. The journey was made in twenty-one hours, and four young men guarded the engine en route to Washington and personally attended to its transfer from one railroad to another.

"With the need for speed as an incentive, tools for building the first engine were made even before the drawings were finished—on the assumption that they would be correct.

"Parts of the first engine were turned out at twelve different factories, located all the way from Connecticut to California. When the parts were assembled the adjustment was perfect and the performance of the engine was wonderfully gratifying. This in itself demonstrated the capabilities of American factories when put to the test and when thoroughly organised for emergency work of this sort.

"One of the chief rules outlined at the beginning of the designing work was that no engineer should be permitted to introduce construction which had not been tried out. There was no time for theorising. The new engine is successful because it embodies the best thought of engineering experience to date. Not only did this country furnish ideas through celebrated consulting engineers, but the representatives in the United States, of England, France and Italy co-operated in the development of this motor

"Thirty days after the assembling of the first engine preliminary tests justified the Government in formally accepting the engine as the best aircraft engine produced in any country. The final tests confirmed our faith in the new engine in every degree.

"Both the flying and altitude tests of the new engine have been gratifying. One test was conducted at Pike's Peak, where the United States aviation engine performed satisfactorily at this high altitude. One of the engines in an aeroplane broke the American altitude record in a recent flying test.

"While it is not deemed expedient to discuss in detail the performances and mechanics of the new engine, it may be said that standardisation is a chief factor in the development of the Government's engine. Cylinders, pistons and every other part of the engine have been standardised. They may be produced rapidly and economically by a great many factories operating under Government contracts. They may be as rapidly assembled, either by these plants or at a central assembly plant.

"The new engine amounts practically to an international model. It embodies the best there is in American engineering and the best features of European models, so far as it has been possible to adapt the latter to American manufacturing methods.

"The two engineers most directly connected with the production of the United States aviation engine had before them not only the blueprints and models of the most successful engines the war has produced, but also every available American suggestion. Men skilled in the invention of motors, both automobile and aeroplane, advised these engineers, who were charged with the duty of providing rapidly and unerringly an engine which would embody every essential of war-time use. Non-essential complexities were consistently discarded by these engineers. The result was a composite design of maximum power, minimum weight, great speed capability and adaptability to quick production.

"The standardisation of parts materially simplifies the problem of repair and maintenance. Spare parts will be promptly available at all times. Even the cylinders are designed separately. It is possible to build the new engine in four models, ranging from four to twelve cylinders, and under the standardisation plan now worked out an eight-cylinder or a twelve-cylinder model can be made, using the same standard cylinders, pistons, valves, cam shafts, and so on.

"With the completion of final tests of the engine—tests which satisfied and gratified both expert engineers and army officers—progress already has been made toward organising industry for the manufacture of the new machines and deliveries will begin within a comparatively short time."

MR. LOENING AT HOME.

Mr. Grover C. Loening, who is well and favourably known to most people concerned with aeronautics in this country, has, on his return to the States found that his practice as a Consulting Engineer has grown to such an extent that he has been compelled to incorporate it under the name of the Loening Aeronautical Engineering Corporation. The address of the new firm is 60, Wall Street, New York, and Mr. Loening has established quite extensive workshops in Long Island City, where he is engaged in constructional developments in connection with the United States Government.

Those who look forward to valuable assistance in aerial warfare from the United States will be glad to note that so capable an aeronautical engineer as Mr. Loening is appreciated at something like his real worth in his own country, and one feels confident that the work on which he is at present engaged will have considerable effect in promoting the efficiency of American aircraft in general.

TWO NEW AMERICAN AERONAUTICAL PAPERS.

The proprietors of "Aviation" and "Aeronautical Engineering," the Gardner Moffat Co., Inc., 120w, 32nd Street, New York, have issued a new weekly called "Air Service Journal," the first number of which appeared on July 12th.

According to the foreword in the first issue, the purpose of this journal is to give "as completely as war conditions will permit all the news of the Army and Navy Air Service."

The "Air Service Journal" contains a fund of information about military and naval training, together with official orders and other information of a purely service character.

The price of the new weekly is 10 cents, or four dollars per annum, foreign postage.

A new monthly, called "Air Travel," has been produced by the Air Travel Corporation, of 280, Madison Avenue, N.Y. The title of this magazine explains itself, and, as a means of popularising aviation, it may serve its purpose.

"Air Travel" combines news with fiction and flying gossip, and as it is certainly the best-printed aeronautical paper in America, the inspection of a specimen copy may be worth while. The price is 25 cents, and the foreign subscription is 3.50 dols.

ITALIAN TRADE NOTES.

Dr. Lawrence Santoni has been elected the first President of a newly-appointed aero-section of the Society for Promoting Italian Industries, called the Scientific and Technical Committee.

This aero section looks as if it might overlap the offices of the Syndicate of Aircraft Industries, which roughly corresponds to the S.B.A.C. However, everyone seems to belong to it, and the A.S. being introduced to the world by the National Aerial League hand in hand with the Syndicate, no doubt everything is for the most possible best. A grand national aeronautical council, formed of all three bodies, is aimed at too.

I feel safe in prophecying that we shall all be very astonished when certain matters relating to the L.T.A. raids of the recent communiqués is allowed to be spoken of. Will a Caproni be the first flying machine to fly to Europe from the States?—T. S. Harvey.

PROPELLER FINISHING.

Naylor Brothers (London), Ltd., of Southall, Middlesex, have issued a war-card setting forth a finishing scheme for airscrews, which has received A.I.D. approval. It would not be advisable to describe in print the exact procedure recommended, as it would be of value to the enemy, but aircraft constructors, who are concerned with the making and finishing of propellers, are invited to apply for copies to the firm's London office at 107 and 409, Oxford Street, London, W.1.

AIRCRAFT WORKERS' WAGES.

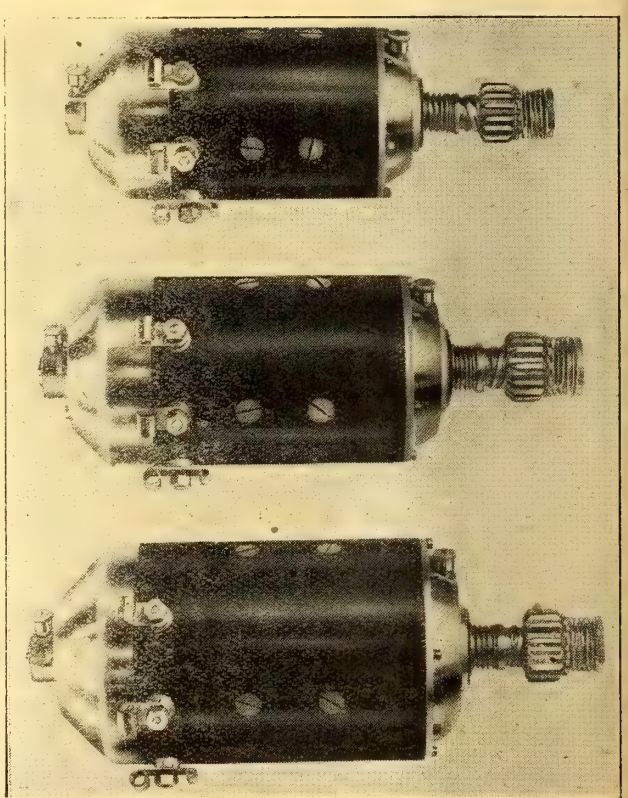
Negotiations for fixing conditions of employment in the aircraft industry are making appreciable progress. An agreement has been reached regarding the maximum week, overtime rates, and other matters, but some difficulties have arisen with reference to the minimum rate. The Air Board and the employers are stated to be in favour of a district minimum rate instead of a national minimum rate, as advocated by the National Aircraft Committee.

VANDERVELL PROGRESS.

That very progressive firm, C. A. Vandervell and Co., Ltd., has just introduced a new electric starter which is one of the lightest for its power yet produced in this country. It belongs to the gear type, which type is possessed of several advantages, being lighter, cheaper, and more efficient than the friction-drive type. The pinion is drawn very slowly into mesh with the spur wheel by means of magnetic influence, a quick thread on the armature shaft bringing it fully into mesh.

It is manufactured in three sizes, the smallest being of sufficient power to start an engine up to 16-h.p., the second size being powerful enough for an engine up to 40-h.p., and the largest size for anything over 40-h.p.

The machines are very simple to operate and appear to possess such workmanship as one would expect from the C.A.V.



Three sizes of the new C.A.V. Self-starter.



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KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

MARKET REPORTS.

Prices given are for quantities on usual terms.

COPPER.—Although the U.S. authorities fixed the price of Copper during last month, September closed with the far more important matter of labour troubles unsettled. The steady consumption is rapidly increasing, huge quantities, in addition to the colossal orders already on the books, having been ordered at the official figure of 23½ cents. The accumulated stocks have, however, decreased to a very low level and there appears to be every indication of a very serious Copper shortage. One understands there nearly one-third of the copper producers are on strike and there only appears to be a very remote chance of an early settlement of the dispute.

The price fixed by the American authorities has eliminated the open market, and, seeing that the price will remain unchanged for four months, consumers are, as stated above, already covering their future requirements.

Upon reference to the Prices Current List it will be observed that in consequence of a reduction in Copper Ingot the prices of Copper and Brass Tubes, Wire, etc., have adjusted themselves.

Supplies here are very satisfactory, and in view of the U.S. labour position the Ministry of Munitions are certainly pursuing a wise course in continuing to increase the list of parts, fittings, etc., which must be made of Steel instead of Copper.

Comparative Prices.

To-day	£110 per ton.
Last Month	£120 per ton.
Last Year	£118 10s. per ton.
Highest Price, 1916	£153 per ton.
Average Price, 1916	£116 per ton.

TIN.—During the past month the Tin market has still maintained an unsettled condition, prices having at one time declined to £241 and then soared again to £247 10s., the highest price since the beginning of August. There appears to be some doubt about large shipments arriving and in consequence it is expected that the market will not become much easier.

Comparative Prices.

To-day	£244 10 0
September 27th	£245 15 0
September 24th	£247 10 0
September 20th	£243 0 0
Highest Price, 1916	£205 0 0
Average Price, 1916	£182 0 0

LEAD.—There is very little to report this week, the strict control having eliminated ordinary business. The collection of Scrap should bring good results, but so would other things if they had not been in the hands of officialdom, so one must await results before relying upon it.

STEEL.—The most important news this week is the big reductions in the prices of American Steel. This, of course, will not directly affect the output of Aircraft Steels; if, however, it is found possible to place large contracts with U.S.A., the Air Board should then be able to put a few more works on the production of billets for the special Steel required for Aircraft use.

The prices are not as low as the official prices fixed here, but they are certainly not unreasonable, and increase the possibility of business now being done.

The Air Board is now exercising rigid control of all Aircraft Steels and firms will not now accept orders unless they have first been sanctioned by the A.B.

One has heard of several instances of unreasonable delay having taken place, but does not wish to be hasty in criticism, and reserves it for a future occasion.

After much delay some of the official A.B. prices have now been fixed, and will be found in the Prices Current List.

TIMBER.—One learns that in addition to the wood mentioned in last week's report, it has been decided to use another wood as a substitute for Silver Spruce, but for obvious reasons one refrains from mentioning its name.

One is pleased to observe that a few nice shipments of Walnut and Mahogany were received last week, at the same time one must not lose sight of the ever increasing demand, which is very much greater than the available supplies of suitable wood.

One is astonished to find that, although the Controller of Timber supplies requisitioned all stocks of Mahogany over a month ago, several firms have not yet had their stocks examined. They are, therefore, unable to do anything with the wood, as they do not know whether it will be taken by the Government inspectors.

It is impossible to procure supplies of Silver Spruce, and it is expected that there will be a big rush for the substitutes immediately supplies are available.

FABRIC.—One is concerned that the Irish labour dispute is still unsettled. One is informed that two representatives of the Government are on the spot endeavouring to effect a settlement, but so far no visible signs of a resumption can be seen. The position becomes very critical indeed, as the stocks held by constructors are rapidly diminishing, and production has practically ceased. It will, therefore, be observed that the outlook is very black indeed.

CURRENT MARKET PRICES.

Oct. 6th, 1917.

The prices given below are the prices ruling on the above date.

Terms.—Usual for the various materials mentioned.

Prices of old metals are as quoted by scrap dealers.

Prices must not be taken as specific quotations for definite quantities delivered to any part of the country.

Aluminium.

Ingot	£225 per ton.
Remelted	£210 per ton.

Brass.

Sheets	15⅜d. per lb.
Strip	14⅜d. per lb.
Wire	14¾d. per lb.
Tubes	16d. per lb.
Castings	15d. per lb.
Turning Rod	14¾d. per lb.
Brazed Tubes	20d. per lb.

Copper.

Ingot, Standard, Cash	£110 per ton.
Ingot, Standard, 3 mos.	£110 per ton.
Best Selected (Nett)	£128 to £124 per ton.
Sheets	£155 per ton.
Wire	16½d. per lb.
Tubes, S.D.	19d. per lb.
Tubes, Brazed	19d. per lb.
Rivets	1s. 11½d. per lb., basis.
Tacks	1s. 11d. per lb.

Fabric.

Linen, R.A.F., 17C, Spec., 36 in. wide, 2s. 8d. p. yd.*
Linen, R.A.F., 17C, Spec. 38 in. wide, 2s. 9½d. p. yd.*
Spaced, R.A.F., 17C, Sepc., 36 in. wide, 1s. 9d. p. yd.*

Gun Metal.

Castings ..... 1s. 8d. per lb.

Lead.

Virgin Pig	£29 per ton, c.i.f.
Virgin Pig	£30 per ton, ex stores.
Sheets	£39 10s. per ton, D/D.
Pipes	£40 per ton.
Dry White	£46 10s. per ton. less 5 per cent.
White in Oil	£53 per ton. (lots over 5 cwt. less 5 per. cent.)
White in Oil	£55 per ton. (lots under 5 cwt. less 5 per cent.)
Red	£42 per ton, less 2½ per cent.

Nickel.

Nickel ..... £200 per ton.

Phosphor Bronze.

Ingots, 5 cwts., and under ..... £159 to £187 per ton.
(Subject to Copper and Tin Fluctuations.)
Castings ..... 1s. 7d. to 1s. 11d. per lb.

Phosphor Copper.

Ton lots ..... £200 to £205 per ton.

Silver.

Silver ..... 48¼d. per oz.

Solder.

Plumber's	103s.
Tinman's	135s.

Steel.

High Speed, 14 p. cent., Tungsten, 2s. 10d. per lb., basis.†
High Speed, 18 per cent, Tungsten, 3s. 10d. per lb., basis.†
†Alloy Steels to Air Board Specifications.

Round and Square :—

Specification No. S2	£86
Specification No. S2 (bright-drawn)	£115
Specification No. S8	£86
Specification No. S10	£70
Specification No. S12	£75
Specification No. S14	£43
Specification No. S15	£70
Specification No. S16	£70
Specification No. S17	£75
Specification No. S18 (oil-hardened)	£86
Specification No. K1	£75
Specification No. K2	£75
Specification No. K3	£86

The above prices are for ¼ in. to 5/16 in. only, other sizes are proportionate.

Hexagons.

	.455 and .525	.601 and .710
Specification S2	£79	£77
Specification S8	£79	£77
Specification S2 (bright-drawn),	£112	£112
Specification S8 (bright-drawn),	£112	£112

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Dear Sirs,—Please find enclosed one pair of Triplex Goggles, which were broken yesterday, when I had the misfortune of crashing a fast experimental machine.

You will be pleased to hear that **Triplex saved my eyes** from being badly cut, and will be also interested to learn that the **Triplex windscreen was unbroken,** though the immediate surroundings were battered.

Faithfully yours,
Signed.....

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Tin .....£243 10s.

Tinplates.

Tinplate .....30s., basis, f.o.t.

Timber.

	Official.	Merchants.
Silver Spruce	10s. 4d.	17s. 9d., c.f.‡
English Ash		13s. 6d., c.f.‡
Mahogany	1s. 6d. to 1s. 10d.	2s. 2d. to 2s. 6d., c.f.‡
Walnut	2s. to 2s. 3d.	2s. 3d. to 2s. 6d., c.f.‡

Zinc.

Zinc Sheets (American) .....£100, f.o.b., New York.

Scrap Materials (London Prices).

Brass, Heavy Selected	£90
Copper, Clean	£100
Copper, Brazery	£80
Lead, no Draft	£26
Zinc, Old	£40
Gun Metal, Scrap	£120

*Official Prices.
†Prices include Delivery in the U.K.
‡Include Selection and Delivery.

MOTOR ACCESSORIES.

Those concerned with the Aircraft Industry who are interested in cars and motor-cycles, are recommended to apply for the pocket catalogue issued by Brown Bros., Ltd., of Great Eastern Street, London, E.C., of accessories and tools connected with the use of these vehicles. Despite its compactness the catalogue contains over 500 pages and some thousands of illustrations so the possession of a copy is very well worth while.

Naturally advancing prices make some of the charges shown in the catalogue inaccurate, but this does not detract from the value of the catalogue as a means whereby articles may be selected and ordered, and one is confident that the prices charged are as low as the costly nature of both material and workmanship will permit.

The catalogue will be sent to anyone who applies, enclosing four stamps in payment of postage.

CONVERTING AMERICA.

"Pall Mall Gazette" of Sept. 27th says:—

The repeated air raids on London, coupled with the fact that French and Italian cities seem by comparison to be immune, though much more accessible, are distinctly hurtful to British prestige here (says the "Daily Mail" New York correspondent).

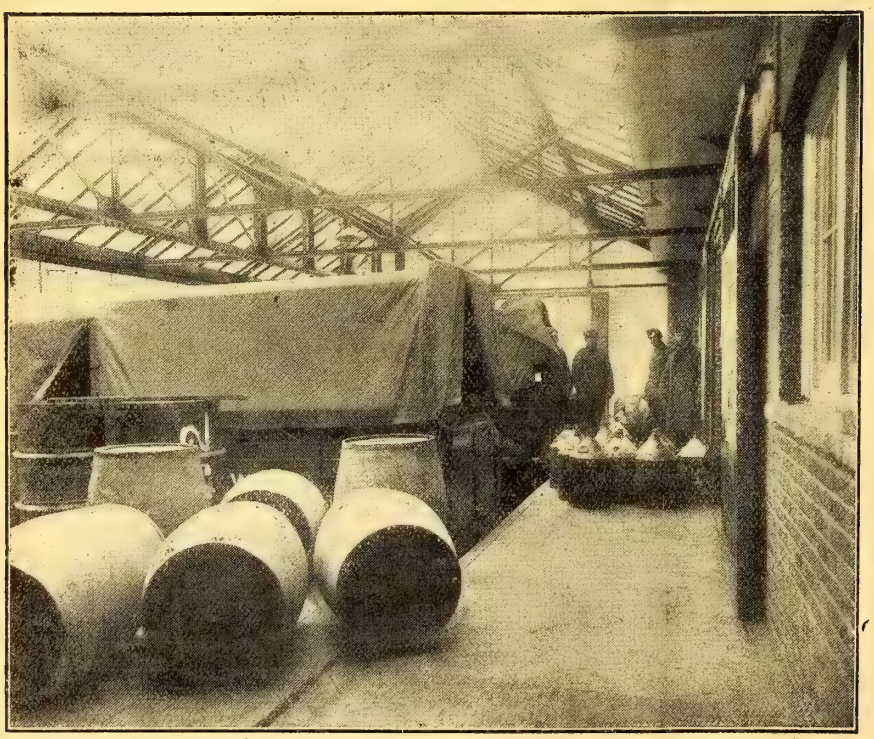
Englishmen are asked continually by Americans, "When are you going to stop those brutes from coming to London?" or "When are you going to hit back?"

Italian flying machines and aviators are now in the United States in considerable numbers, and the impression is general that so far as the air is concerned, Great Britain ranks rather a bad fourth, France being first, Germany second, and Italy third.

[As a matter of fact it is probably Germany first, Great Britain second, France third, and Italy fourth, but perhaps the erroneous view obtained by the Americans may convince our official people of the benefit of sending to the States a few really capable representatives and two or three of our best aeroplanes such as our young flying officers crash daily with such complete nonchalance. Perhaps the Americans would then change their views as to what country makes the best aeroplanes, both as regards performances and quantities.—Ed.]



A VISTA OF DOPE TINS.—A consignment of Cellon Dope manufactured and ready for delivery within 36 hours of the order being received over the telephone.



RAPID DESPATCH.—R.F.C. Lorries taking away the dope illustrated above.

A REGENT STREET SALE.

The majority of the readers of The Aeroplane are probably more familiar with the naval and military outfitting department of Robinson and Cleaver, Ltd., than with their linen department, which is really the most important side of the firm's business; nevertheless, most readers have feminine belongings to whom such a department is of prime interest.

The autumn white sale has now commenced, and many bargains are to be had. A speciality is being made of Irish linens, and many pieces are being offered at prices 5s. to 6s. 8d. in the £1 below current rates.

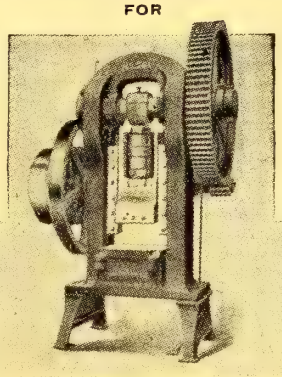
Feminine readers of The Aeroplane especially will find much to interest them at Robinson and Cleaver's, and an illustrated catalogue may be obtained upon application to Robinson and Cleaver, Ltd., Regent Street, W.

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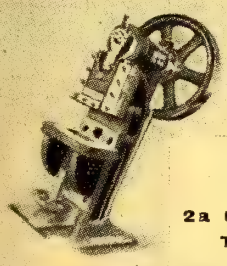
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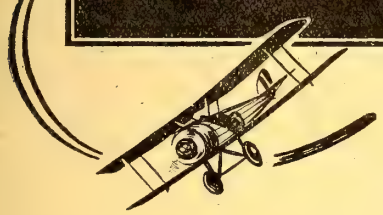
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THE PATENTS INDEX.

The subjoined list of inventions has been specially compiled by The Aeroplane from the current Official Patents Records.

Patent Applications.

Brewer, G. Balloons. No. 1317. Sept. 24th.
Brown, E. E. Metal frames for aircraft. No. 13856. Sept. 26th.
Browne, W. Construction of hangars for aircraft. No. 13889. Sept. 26th.
Cuthbertson, H. S. Cowling of engines for aircraft. No. 13904. Sept. 27th.
Edwards, A. H. Projectiles for use against aircraft. No. 13743. Sept. 24th.
Handley, J. W. Air propeller. No. 13691. Sept. 24th.
Lardent, A. E. Planes for aircraft. No. 13905. Sept. 27th.
Mathews, T. Flying-toys. No. 14082. Sept. 29th.
Moir, Sir E. W. Woodwork for aircraft, etc. No. 13999. Sept. 28th.
Pomilio, G. Operation and mounting of machine, etc., guns upon aeroplanes, etc. No. 13897. Sept. 26th.
Siddeley-Deasy Motor Car Co. Landing chassis of aeroplanes, etc. No. 14014. Sept. 28th.
Taylor, T. Apparatus for navigating aircraft. No. 13927. Sept. 27th.
Towers, R. Aeroplane engine exhaust-extractor. No. 13707. Sept. 24th.
Wray, G. Airship. No. 13937. Sept. 27th.
Wray, G. Airship. No. 13958. Sept. 27th.
Wray, G. Aeroplane. No. 13957. Sept. 27th.

Complete Specifications Accepted, Prints of which can be obtained on and after October 18th, 1917.

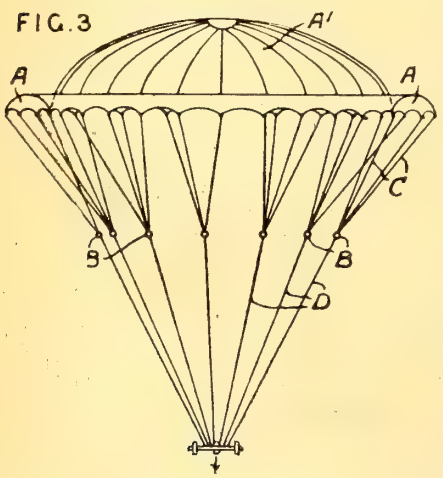
109,636. August 17th, 1916. Ahlbrecht, A. Planes of aeroplanes.
109,672. Sept. 30th, 1916. Pybus, P. J., and Phœnix Dynamo Manufacturing Co. Aircraft for observation and like purposes.

Abridgments of recently published Specifications.

108,364. Parachutes. Croxton, W., 16, Cassimer Terrace, Clapton, London. August 9th, 1916, No. 11226. [Class 4.]

To facilitate the opening of a parachute for use with aircraft, an annular "curtain" A of silk, linen, india-rubber etc., is attached to the periphery of the parachute A^1 and is connected by lines C to thimbles B sliding on the main lines D, which are secured to the periphery of the body A^1. The curtain does not support any weight until the thimbles B engage stops on the lines D. In a modification, the main lines D are attached to a band fitted round inside the parachute, the periphery of which is then connected by the lines C to the thimbles B. A flap valve may be fitted at the apex of the parachute. The container for the parachute is preferably of streamline shape, and may be formed on two spring-hinged parts, so that the whole parachute is presented to the air when a catch is released.

FIG.3



108,383. Screw Propellers. Smith, A. E., 18, St. James' Road, Kingston-on-Thames. Sept. 12th, 1916, No. 12875. [Class 114.]

The hub joints for laminated propellers are arranged so that the centre lines of the laminæ pass to one side of the centre of the hub and by their intersections form an equilateral triangle or square surrounding the centre of the hub. The end of each lamina is reduced to engage a recess cut in the side of another of the same set, all such recesses being on one side of each lamination so that all the laminæ in each layer mutually support one another to resist the thrust. In the example shown in Fig. 1, the ends *g* of the laminæ *f* are recessed into the sides *e* representing the leading edges. Fig. 3 shows three modifications for the cuttings for the joints. A central space may be left adapted to receive the hub bush or a wire-spoked wheel forming the centre of the propeller.

FIG.3.

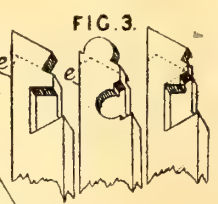


FIG.1.

108,405. Aeroplane Hangars. Robinson, P., 2, Albion Place, and Airey, E., Cleveland House, Springwood Road, Roundhay, both in Leeds. Oct. 23rd, 1916, No. 15026. [Class 20 (i).]

The hangar is T-shaped in plan and slopes gradually from front to back, thus following in general outline the form of the aeroplane. The walls and roof consist of light timber-framed and creosoted leaves or sections A bolted or clamped together so that the hangar can be taken down and re-erected elsewhere. The lintel is formed of two or more beams jointed by means of fish-plates and bolts and is supported by cantilever beams D running from front to back over opposite sides of the rear or central bay and bolted to the lintel by means of steel cleats. The beams D serve to stiffen and bind the whole building together. Ring posts G, carrying ropes F which can be tightened, prevent the lintel from sagging. The walls and roof may be covered with canvas or other light material and the front may be fitted with waterproof canvas curtains, or with collapsible doors.

FIG.3.

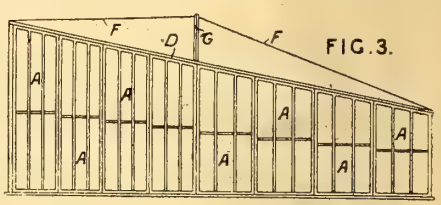
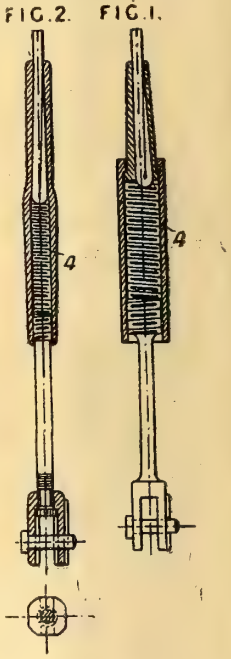


FIG.2. FIG.1.



108,423. Connecting Wires to Strainers, etc. Quaglia, G., 66, Corso Vittorio Emanuele, and Capello, A., 66, Via Montevecchio, both in Turin, Italy. Dec. 22nd, 1916, No. 18426. Convention date, Aug. 26th, 1916. [Classes 45, 99 (i), and 109.]

Wires, such as aeroplane stay wires, are connected to hooks, straining-devices, etc., by flattening the end of the wire, bending it over to form a wedge-shaped end and inserting it in a tapered hole in the connecting member. In the form shown in Fig. 1, the tapered hole is formed in a socket swivelling in an internally-threaded straining-sleeve 4 in such a manner that one side of the hole is parallel to the centre line of the wire, the other side only being tapered. In a modification, the socket and sleeve are made in one piece, as shown in Fig. 2, a tapered hole for the reception of the wire being first formed therein and the sleeve then compressed on two sides. In both forms, the sleeve is screwed in one direction only.

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B. AND P. MOVEMENTS.

Owing to an error in transcription it was made to appear in last week's Aeroplane that Mr. Edouard Boudot, late of the North British Diesel Engine Works, Ltd., Glasgow, had been appointed chief buyer of Boulton and Paul, Ltd. As a matter of fact, Mr. Boudot has been appointed chief draughtsman of the technical department of this famous firm. The new chief buyer at Boulton and Paul, Ltd., is Mr. E. M. Hood, who has had very considerable experience of this class of work.

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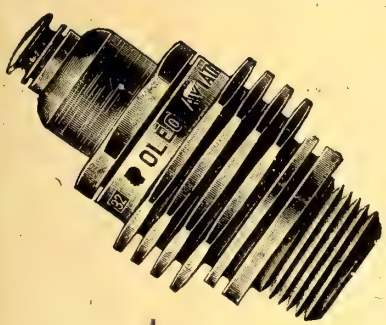
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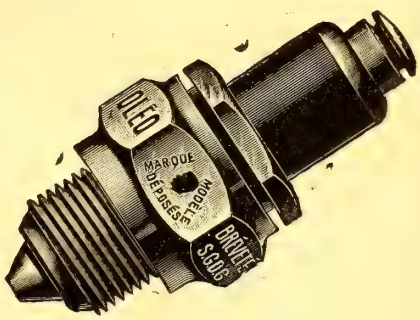
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AIRCRAFT FINANCE

CURRENT TOPICS.

Limited Liability under the Company Acts.

Replying to a correspondent who adopts the appropriate nom-de-plume of "Lex-luminæ," asking for specific details and information as to the benefits of working a business as a private company under the Limited Liability Acts, and the necessary formalities, I set out the information in detail in these columns, as I feel that it will be of interest to a very large number interested in the aeroplane industry.

It is a well-recognised fact that, owing to the safe and equitable principles which constitute the bases of the Limited Liability Laws in this country, our system of trading, producing, manufacturing, and distributing has of late years undergone a great and progressive revolution. Limited liability has the primary advantage of limiting one's personal liability and protecting one's personal property. It permits the allocation of varying interests, and it facilitates the securing of any additional capital if and when required, for development or extension of business.

Commercial men recognise that limited liability is the only safe method of trading, for two important reasons: firstly, the person investing can receive a given number of shares equal in face value to the amount of money put into the business; he is thus assured of receiving his proper proportion of the profits, and no dispute can possibly arise in that respect; secondly, he is secure in the knowledge that his liability is absolutely limited to the amount of his share interest, which means, in plain English, that, should the undertaking in question prove a failure owing to bad trade, keen competition, or for some other cognate reason, the loss in connection with it cannot exceed the actual capital invested, whereas were the undertaking in question a private trading firm, not protected under the Joint Stock Companies Acts, and, should failure ensue, the partners in such an event would be jointly or severally liable to the creditors out of their private estates for the amount of the difference between the sum realised by the assets when disposed of, and that representing the total liabilities of the partnership.

The security in and advantages of investing under limited liability are thus obviously apparent. Many companies are formed solely for the purpose of placing the proprietors in a position to raise, as and when required, additional working capital to cope with the increase in trade.

Investors taking up shares in one or other of these companies become, to all intents and purposes, limited partners in that particular business, and receive their due proportion of profit just as they would were they trading as an ordinary private partnership concern, and also (which is the main point to be considered) absolutely limit their liability to the nominal amount of the shares they hold, although the amount of profit which may be derived by way of dividends or bonus on their shares is unlimited. Investors, large and small, recognise and appreciate the safety of the handsome returns realisable from and the great security attached to share investments in substantial private limited liability companies.

It must be borne in mind that it is illegal for any partnership or association consisting of more than twenty members to carry on any trading concern, and that such a partnership or association is required to be registered as a limited company. The association or partnership of more than twenty individuals, whether trading as a company or otherwise, cannot sue in law, but can be sued; and, further, all officials are liable to penalties for every day that business continues to be carried on through any association, group, or partnership consisting of more than twenty members.

The partnership or association, therefore, to become a private company, should be registered as a limited company under the Companies (Consolidation) Act of 1908, and such a company limited to 50 members (exclusive of persons in the employment of the company) is a private company, and by its articles of association prohibits any invitation to the public to subscribe for shares, and restricts the right of transfer of its own shares.

The advantages of trading under limited liability, as against the risks of an unlimited partnership, both to large and small traders as well as investors and capitalists, are numerous.

Income Tax Regulations.

A White Paper was recently issued by the Chancellor of the Exchequer dealing with the vexed question of the valuation of stocks, allowances for wear and tear, depreciation and obsolescence of assets, for the purpose of excess profits duties. This new Government regulation has been framed with the object of guiding the Board of Inland Revenue, and is of particular interest to the aircraft industry.

The regulations are framed by the Committee of Consulting Accountants, acting as advisers to the Ministry of Munitions. This committee emphatically states that there is only one sound general principle for the valuation of stocks, and making the requisite depreciation of wasting assets, and there is no doubt that every chartered accountant will adopt the principle in dealing with these questions in the future framing of balance-sheets.

Directors, managers, and other officials of limited companies would, therefore, do well to take careful note of this new regulation.

The Bleriot Manufacturing Aircraft Company, Limited, (In Liquidation).

All interested in the aircraft industry will recall the flotation of this company in June, 1915, which was made with "Treasury consent," and many will have followed the subsequent proceedings resulting in the company passing into the hands of the Official Receiver. Rumours of every kind, from a number of sources, have been rife, and much concerning the company has been "wropt in mystery."

I received a notice emanating from a well-known firm of solicitors convening a meeting of shareholders to be held at the Cannon Street Hotel last week, and I resolved to, and did, attend the meeting with the object

of obtaining, as far as was possible, the fullest information concerning this flotation, for the benefit of the readers of this article. I consider that the whole industry has an important capital interest to safeguard in connection with public investment in the aircraft industry, and I feel one has an important moral obligation and a duty to the public to investigate everything having any connection with the finance of the industry.

The meeting was convened by Messrs. Amery Parkes & Co., the well-known solicitors, and Mr. Harry J. Lawson occupied the chair. Mr. Lawson explained to the meeting the inception and history of the flotation of this company in great detail. He stated that M. Blériot, after much negotiation, entered into a contract with the Army & Navy Syndicate, Ltd., of which he (Mr. Lawson) was managing director, for the purchase of the Blériot business for the sum of £28,000 in cash, plus one-quarter interest in the company to be formed, and was paid a certain cash deposit as provided for in the said contract.

The negotiations between the Army & Navy Syndicate, Ltd., and M. Blériot were carried out by Mr. William A. Casson, barrister-at-law, who acted as intermediary. The "subscription list" to the flotation was opened to the public on Thursday, June 24th, 1915, and closed on the following Monday, during which time M. Blériot attended the offices of the company and assisted in the details of the flotation. The result of the public issue was that over a thousand investors applied and were allotted shares, the result being that the capital was over-subscribed.

The directors thereupon convened a meeting to complete the contract with M. Blériot, which Mr. Casson attended and notified the directors that M. Blériot had returned to France and refused to proceed and carry out the transfer of his business to the company. A writ was immediately issued by the promoting syndicate against M. Blériot for "specific performance." This proceeding was rendered abortive by a petition being presented by a shareholder to the Courts to wind up the company.

It is alleged by Mr. Lawson that the petitioner was a man of straw, holding shares paid for by Mr. Casson, and that M. Blériot and Mr. Casson had together conspired and induced him to file the petition (which it is alleged contained many false statements) with the specific object of thus evading their legal obligations.

At this stage Mr. Lawson explained that he was incapacitated for some months, in consequence of injuries he sustained on the "Sussex" when that vessel was torpedoed in the Channel, and he went on to relate that at this period Mr. Casson entered an action against him for libel. The result of the trial was a verdict in Mr. Lawson's favour, given without the jury leaving the box.

In the course of this action the Blériot matter was reviewed. Mr. Lawson, acting as his own counsel, cross-examined Mr. Casson, when Mr. Casson was compelled to admit that the contract entered into with his principal, M. Blériot, was perfectly in order, and that the prospectus was legal and correct in every detail. Fortified by the admissions made by Mr. Casson, Mr. Lawson was prepared to take a certain course of action, when suddenly Mr. Casson was arrested under another charge, the details of which are now public property.

Mr. Lawson went on to point out that, but for the winding up of the company, M. Blériot would have been compelled to complete the transfer of the business. I am given to understand that the Official Receiver is now suing M. Blériot for £118,000, a sum which one must therefore consider is the amount this official estimates will be the sum due to the shareholders.

Mr. Lawson went on to state that he had consulted eminent counsel, and was informed that under the Companies Acts a "stay" of the liquidation proceedings could even now be obtained, providing a petition was lodged, properly supported by the shareholders, particularly in view of the fact that the company has no creditors against it.

This being done, it would be open to the company to proceed against M. Blériot for an account and return of the profits he had made, and to sue for "specific performance" of the contract. This meeting had been convened for the special purpose of appointing a committee of shareholders to confer with the solicitors and take the steps he had outlined on behalf of and in the interests of the shareholders of the company.

After some discussion on points of detail, a resolution to this effect was then proposed and seconded. The resolution was carried unanimously, and a committee of seven shareholders was immediately appointed. I understand this committee sat immediately after the meeting and subscribed a considerable guarantee fund. They then instructed Messrs. Amery Parkes & Co. to take the necessary legal steps forthwith to give effect to the views which had been expressed.

It does not fall within my province to judge; that is for the Courts; but I may say that never in the history of modern finance have I met such a remarkable story.

Whatever may be the legal and technical points, it appears "prima facie" that proper legal contracts were entered into by M. Blériot for the sale of his business, and the main point that interests one as guardian of the *moral* of aviation finance is that it is clear that if the business had been carried out the shareholders to-day would be receiving handsome profits.

One takes no interest in Mr. Lawson personally, nor is one concerned in whatever may be said for or against his personal reputation, as whatever view one may take of this gentleman, it is inconceivable that it can justify the course adopted by M. Blériot acting on a contract signed in this country. One should watch with a jealous eye the interests of the very numerous shareholders who have parted with their money in their desire to become investors in the aeroplane industry, and I shall again refer to this business as soon as there are further developments.

G. A.

CURRENT QUOTATIONS.

The following are the current quotations made up to Tuesday morning in each week of the principal companies engaged in the Aircraft Industry and Kindred Trades.

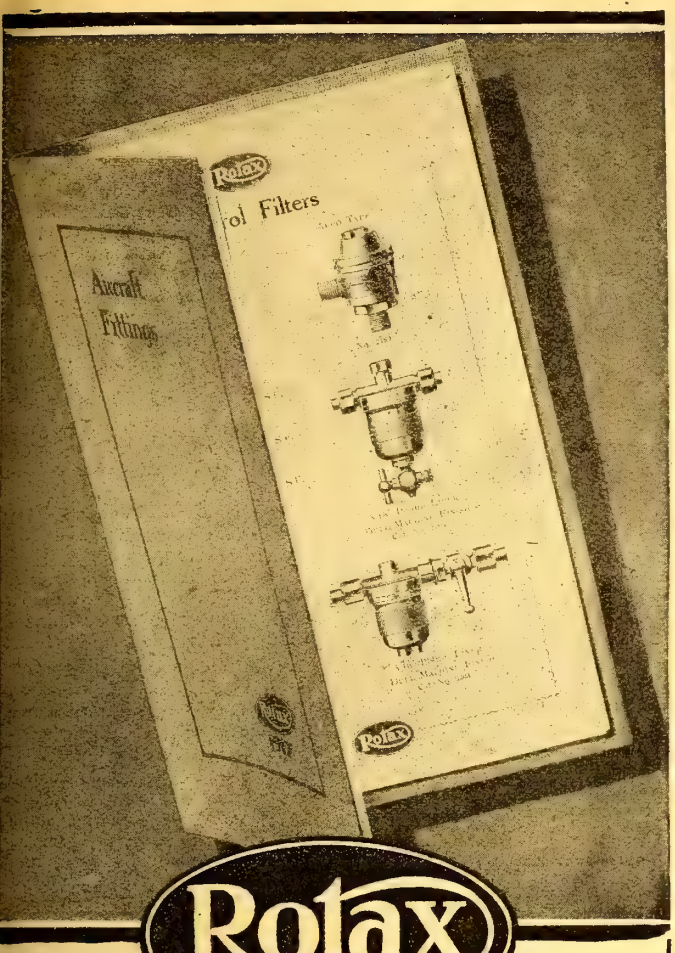
Aircraft Mnfg. Co.	7% cum. pref. £1 ...	23/-	24/-
Armstrong (Sir W. G.) Whitworth & Co., Ltd.	4% cum. pref. £5...3-5/16	3-7/16x	
	5% 2nd. pref. £1 ...	17/-	18/-x
	£1 ordinary	39/-	40/-x
Austin Motor Co., Ltd.	7% cum. pref. £1...	18/-	19/-
	£1 ordinary	23/-	24/-
Birmingham Small Arms Co., Ltd.	£1 ordinary	52/6	54/6
	5% cum. "A" pref.	4-5/16	4-7/16
	5% cum. "B" pref.	21/9	22/3
Boulton & Paul, Ltd., 5% cum. pref. £1		3/8	7/8
Brown Bros., Ltd., 6% cum. pref. £5...		4⅛	4⅝
Darracq (A) & Co., (1905) Ltd.	£1 ordinary ...	33/6	34/6
	7% cum. pref. £1...	22/6	23/6x
Electric Construction Co., Ltd.	7% cum. pref. £1...	19/3	19/6
	£1 ordinary	1	1-1/16
Fellows Magneto Co., 8% cum. partip. pref.		17/-	18/-
General Electric Co., Ltd.	6% cum. pref. £10	10-5/16	10-7/16
	£10 ordinary	17	18
Gwynnes, Ltd., 5% cum. pref.		91/-	92/-
Ordinary		8/3	8/6
Greenwood & Batley, Ltd., £10 ordinary		9	10
Humber, Ltd., 6% cum. pref. £1		17/-	18/-
£1 ordinary		18/-	19/-
Napier (D) & Son, Ltd., 7½% cum. pf. £1		18/-	18/6
Peter Hooker, Ltd., £1 ordinary		21/-	22/-
Rolls Royce, Ltd.. £1 ordinary		57/-	58/-
Rudge Whitworth, Ltd. £1 ordinary ...		41/-	42/-
Ruston, Proctor & Co., Ltd.	£1 ordinary	26/-	27/-
	5% cum. pref. £1 ...	17/-	17/6
Sunbeam Motor Car Co., Ltd., £1 ord...		88/-	90/-
Straker Squire, Ltd. (1913), £1 ordinary		24/-	24/6
S. Smith & Son, Ltd. (Motor Accessories) £1 ordinary		25/6	26/6
Triplex Safety Glass, £1 ordinary... ...		19/6	20/
Vickers, Ltd., 5% pref. stock...		78	82
	5% pref. shares. £1 ...	18/6	19/-
	£1 ordinary	39/-	40/-
Wm. Beardmore & Co., Ltd., 6% c. pf. £1		19/-	19/6

GENERAL INFORMATION.

Armstrong, Whitworth (1916).
Austin Motor (1916).
Rolls Royce.
Rudge Whitworth.
Straker-Squire (1915).
Sunbeam Motor.
Thorneycroft (J. I.) & Co.
Vickers (1915 and 1916).

Owing to the difficulty of estimating liabilities under Finance and Munitions Acts, the accounts will not be ready until a later date.

(x—ex dividend.)



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(*Continued from page 1024.*)

BARWELL.—Capt. Frederick Leycester Barwell, London Regt. and R.F.C., previously reported missing, now reported killed on April 29th last, aged 22 years, was the eldest son of Mr. and Mrs. Leycester Barwell, of The Tower, Ascot. On the outbreak of war he had just left Malvern College to enter Pembroke College, Cambridge, but at once enlisted in the Queen's Westminster Rifles, receiving his commission six weeks later. He went to France with his battalion on November 1st, 1914, and served there until August, 1915, when he had sick leave. He returned to the front in April, 1916, and in the following September was sent home slightly wounded. Last January he transferred to the R.F.C. He received his first flight, under instruction, on February 28th, and gained his pilot's certificate on April 9th, proceeding to the front on April 13th. He received his second star in April, 1915, and was promoted temporary captain on July 1st, 1916, and captain on April 28th last, the day before he was killed.

His Squadron Commander writes:—"We miss him awfully in the squadron, both as a pilot and in the mess. Although he had only been with us a very short time he was very popular indeed, and was already a very good pilot, and showed signs of becoming a brilliant one. He died one of the finest deaths in quite the finest way. Capt. Barwell was killed after a gallant fight of half an hour's duration with a number of enemy aeroplanes, which he attacked single-handed. He was buried by the enemy with military honours."

CHAPMAN.—Major Charles Meredith Bouverie Chapman (Squadron Commander), M.C., Chevalier de l'Ordre de Léopold, Lieut., "The Buffs," attached R.F.C., who died of wounds on Oct. 1st, was the eldest son of Mr. and Mrs. William C. N. Chapman, Heppington, Canterbury. He was 25 years of age.

FEATHERSTONE.—"Accidental death" was the verdict at a Westminster inquest on Oct. 4th on Sec. Lt. Walter Featherstone, R.F.C., aged 27, of North Lodge, Hatfield. Evidence showed that he, although still under training, recently performed flights by himself for 20 hours, and he went for a practice flight in Middlesex on Oct. 3rd. He "taxied" and then rose to a height of about 100 feet. Going up too steeply, the machine "stalled," pitched to the right in a "flat spin," and vertically nose-dived. Flames broke out, and he was terribly burned, having in addition a fractured ankle, sustained through being partially thrown out. He was removed to Eaton Square R.F.C. Hospital, where he died. Brother officers expressed the opinion that he lost his head on finding his difficult position.

FENWICK.—Sec. Lt. W. Cecil Fenwick, R.F.C., who was reported missing on Oct. 7th, 1916, now known to have been killed on that date in air fighting on the Somme, was the eldest son of Mr. and Mrs. C. F. Fenwick, of 3, Tring Avenue, Ealing. He was 19 years of age.

LOYD.—Capt. and Flt. Comdr. Alwyne Travers Loyd, The Buffs, attd. R.F.C. (killed in action on Sept. 28th), was third son of Mr. and Mrs. Llewellyn F. Loyd, of Lillesden, Hawkhurst, Kent. He was 23 years of age and was appointed Flt. Comdr. R.F.C. in November of last year.

MIALL-SMITH.—Lt. G. E. Miall-Smith, M.C., R.F.C. (formerly 8th Norfolk Regt.), who was killed while flying on Sept. 25th, was the only surviving son of G. A. and Mrs. Miall-Smith, Fern Lodge, Millfield Lane, Highgate, N. He was 22 years of age.

PEMBER.—Lt. Edward Horace Pember, R.F.A. and R.F.C., who was killed on Sept. 30th, aged 19, was the only surviving son of the Warden of All Souls College, Oxford. He was educated at Mr. L. T. Thring's School at Hove and at Harrow, where he was in Mr. A. Vassall's house. In 1910 he won an entrance classical scholarship at Harrow, and in 1914 he was elected to a mathematical exhibition at Balliol College, Oxford. At Harrow he was a member of the O.T.C., and in the school shooting eight in 1915.

He received his commission in the R.F.A. in July, 1915, went out to Suvla Bay in the following November, and, after the evacuation, was for some months in Egypt with his battery. In the autumn of 1916 he joined the R.F.C., and he had been flying at the front since the first week in May. On the morning of Sept. 30th he was flying over the enemy's lines taking photographs, when he was attacked by four enemy scout machines, who came down on him suddenly from a great height. His machine was brought down, and both he and his observer were killed instantly. He was buried on Oct. 1st.

RICHARDSON.—Lieut. William Richardson, R.F.C., has been killed in a flying accident in the south of England.

THORNTON and LEWIS.—An inquest was held in Warwickshire on Oct. 8th on the body of Sec. Lt. Thornton, R.F.C., who lost his life in an aeroplane accident on Oct. 5th. The evidence showed that the accident was due to an error of judgment on the part of the pilot, Sec. Lt. Lewis, R.F.C., who, thinking he was higher from the ground than was actually the case, attempted a left-hand turn at a height of 100 ft. In the fall Mr. Thornton, who was acting as observer, had his neck broken. A verdict of accidental death was returned. Mr. Lewis, who had several limbs broken, died on Oct. 8th.

TOMLIN.—Sec. Lt. Harry Francis Tomlin, R.F.C., who was killed in action on Sept. 28th, was the only son of Mr. and Mrs. H. T. Tomlin, "Nilmot," Madeira Place, Brighton. He was 20 years of age.

TOBIN-WILLIS.—Lt. Jack Tobin-Willis, R.F.C. (killed in action on August 17th), was the only son of Dr. and Mrs. Willis, also nephew of Dr. Tobin, of Ilkeston, Derbyshire, and grandson of the late James Tobin, of Tincurry House, Cahir, County Tipperary. He was 21 years of age, and was educated at St. Cuthbert's, Newcastle-on-Tyne, and afterwards by the Benedictines at Douai Abbey. He was a law student and an undergraduate of London University. Having got his commission in the A.S.C. he went to France in January, 1915, and was posted to a Cavalry division, whose fortunes and adventures he shared as supply officer, claims officer, mess president, and adjutant up to his volunteering for the R.F.C. This was about six months ago, when he came to Brooklands for his training as gunner and observer. He was quickly back in France again. Having won his wings he became more especially engaged in observations of German artillery. It is in record that he and his pilot, Lt. Sayers, accounted for two German aeroplanes on August 14th, but three days later the fortunes of war were reversed, and they both fought their last fight within sight of the great battlefield of Ypres.

WARD.—Major George Bernard Ward, M.C., R.F.C. (killed in action), was appointed Squadron Comdr. in Dec. last year. His award of the Military Cross was gazetted a month before for conspicuous gallantry in action. The official account stated that "he flew over the enemy's lines at a height of 1,000 ft. under heavy fire, and carried out a very successful artillery reconnaissance. He has previously done very fine work."

WELCH.—Lt. Hugh Welch, R.F.C., who was missing after an air fight on March 28th last, and is now reported killed on that date, was the eldest son of Mr. T. H. Welch, Ordnance Factories' Civil Staff. He was in his 21st year, and was educated at Lt. Chamberlain's School, Eltham, and Merchant Taylors' (1906-1912). He was with the Royal Exchange Assurance when the war broke out, and enlisted in the 2nd London Brigade, R.F.A., on August 10th, 1914, being commissioned the same month. He joined the R.F.C. in September, 1915, and served as observer at the front from October, 1915, to April, 1916, and as pilot from last December.

WORSTENHOLM.—Sec. Lt. John Worstenholm, R.F.C., only son of Mr. L. Worstenholm, editor of the "Northern Echo," Darlington, has been killed in action. Educated at Darlington Grammar School, he obtained two scholarships, and proceeded a year ago to Cambridge University. At Christmas, on attaining the age of 19 years, he joined the Artists Rifles, and four months later was transferred to the R.F.C. He had only been at the front for five weeks.

YOUNG.—Sec. Lieut. Harold Farquhar Young, Sherwood Foresters, attd. R.F.C., who was reported missing on Aug. 20th last, after a flight over the enemy lines, is now reported by a German newspaper to have died. He was the only son of Fred Young, Old Bank House, Burton-on-Trent, and was 19 years of age.

Engagements.

ADDINSELL—BLACK.—A marriage has been arranged, and will take place quietly on Saturday, October 13th (leave permitting), between Lt. Jack E. Addisell, Royal Munster Fusiliers and R.F.C., third son of Mr. and Mrs. W. Arthur Addinsell, of Harrow Weald Lodge, Middlesex, and Muriel, second daughter of Mr. and Mrs. R. J. Black, of 29, Wellington Court, S.W., and The Knipp, Chiddingfold, Surrey. The ceremony will be at St. Paul's, Knightsbridge, at 2.30. All friends will be welcome at the church, but there will be no reception.

DE ROEMER—LIDDELL.—A marriage is arranged between Capt. Charles William de Roemer, R.F.A., attached R.F.C., only son of Major and Mrs. de Roemer, Lime Park, Hurstmonceux, Sussex, and Audrey, eldest daughter of the late Charles Lyon Liddell and Mrs. Liddell, Place House, Peasmarsh, Sussex.

HODGES—CRACKNELL.—An engagement is announced between Capt. A. G. A. Hodges, Northampton Regt. and R.F.C., elder son of the Rev. H. A. and Mrs. Hodges, Barrow-on-Trent, Derby, and Margaret Enid, elder daughter of Mr. and Mrs. R. J. Cracknell, 61, Babington Road, Streatham, London, S.W.

LAMROCK—GERMAINE—The engagement is announced of Mr. C. R. Lamrock, R.F.C., son of the late Mr. S. C. Lamrock, Barrister, and Mrs. Grieve, of N.S. Wales, and Carrie Evelyn, elder daughter of the late Mr. R. A. Germaine, K.C., Recorder of Lichfield, and Mrs. Germaine, of 21, Philbeach Gardens, S.W.

Marriages.

ANGELL—MATHEWS.—On Oct. 2nd, at the Roman Catholic Church, Romford, Lt. Bruce O. Angell, R.F.C., only son of H. O. Angell, of Crichel, Wimborne, Dorset, was married

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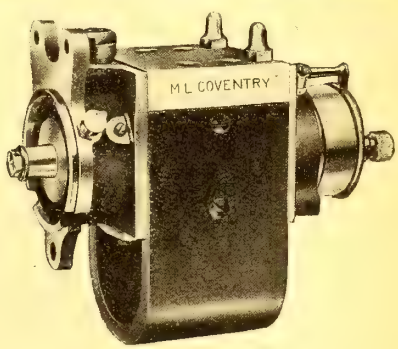
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to Doris, only daughter of W. G. K. Mathews, R.I.M.S., and Mrs. Mathews, of "Parvati," Gidea Park, Essex.

BERKELEY—CHARLES.—On Oct. 2nd, at St. Matthew's, Bayswater, Frank Charles Berkeley, R.F.C., only son of J. H. Astley Berkeley and Mrs. Berkeley, of Grenada, West Indies, was married to Amelia Flora Charles, second daughter of David Charles and Mrs. Charles, of Swansea.

BURNSIDE—HAMMOND.—On Sept. 28th, Lt. G. C. Burnside, R.F.C., of Glasgow, was married to Winifred, third daughter of Capt. and Mrs. Hammond, of Stopford Road, Upton Manor, Essex.

BUSH—EVANS.—On Sept. 22nd, at Emmanuel Church, Clifton, Graham Shurmur Bush, R.F.C., youngest son of Philip W. Bush and Mrs. Philip Bush, of the Old Manor House, Keynsham, was married to Leonora Brittan, daughter of H. Brittan Evans and Mrs. Brittan Evans, of 32, Pembroke Road, Clifton.

FOWLER—GREENE.—On Oct. 4th, at the Parish Church, Cirencester, Capt. R. Charles Fowler Northamptonshire Regt., attd. R.F.C., eldest son of the late Dr. O. H. Fowler, of Cirencester, was married to Ethel Mary, second daughter of Mr. and Mrs. Greene, of Moore House, Whalton, Northumberland, and Oakley Cottage, Cirencester.

GOSSAGE—O'BRIEN.—On Oct. 5th, 1917, at St. Margaret's Church, Buxted, Sussex, Maj. Ernest Leslie Gossage, M.C., R.F.A. and R.F.C., eldest son of Colonel E. F. Gossage, V.D., of Dorin Court, Uptonheath, Chester, was married to Eileen Gladys, only daughter of Brigadier-General E. O'Brien, C.B., late 14th Hussars, employed on active service, and Mrs. O'Brien, at the Rectory, Buxted, Sussex, by the Rev. G. S. Pownall, Rector of Buxted.

HALL—WELLS-COLE.—The marriage took place last week at Lincoln of Capt. G. H. Hall, Yeo. and R.F.C., eldest son of Sir Henry Hall, I.S.O., and Lady Hall, of Chester, and Miss M. G. Wells-Cole, younger daughter of the late G. F. Wells-Cole and Mrs. Wells-Cole, of Stones Place, Lincoln.

HARDY—DICKINSON.—On Monday, Oct. 1st, at St. Nicholas' Cathedral, Newcastle-upon-Tyne, Lt. G. P. U. Hardy, R.G.A. and R.F.C., only son of Mr. and Mrs. Paul Hardy, of The Cottage, Storrington, was married to Sophia Helena (Ena), younger daughter of Mr. and Mrs. A. H. Dickinson, of Eastfield, Gosforth, by the Rev. Canon Newsom.

KNIGHT-BRUCE—AVELING.—On Oct. 6th, at St. Stephen's Church, S.W., Capt. R. E. C. Knight-Bruce, Yeomanry and Royal Flying Corps, of the Sanctuary, Crediton, Devon, was married to Evelyn, elder daughter of Mrs. Neville Aveling, St. Germans Hall, Norfolk, by the Rev. Paul Cleave and the Rev. Lord Victor Seymour, Vicar of the Parish.

LITHGOW—BALFOUR.—On Oct. 2nd, at the Parish Church, Tetbury, Major Ernest Lithgow, R.A.M.C. and R.F.C., eldest son of Dr. Lithgow, of Farnborough, was married to Doris, elder daughter of Lieut.-Colonel A. M. Balfour, D.S.O., R.F.A., and Mrs. Balfour, of The Close, Tetbury, by the Rev. A. L. Whitfeld, Vicar of Hughenden, assisted by the Rev. W. Thomson, LL.D., Vicar.

MAITLAND—LEWIS.—The marriage between Francis E. Maitland, son of Mr. and Mrs. Thomas Maitland, of Reres Cottage, Broughty Ferry, and Margaret, widow of Lieut.-Colonel D. S. Lewis, D.S.O., R.E. and R.F.C., and daughter of Mr. and Mrs. Philip Williams, of The Malt House, West Woodhay, Newbury, took place at St. Dunstan's in the West, Fleet Street, at 2 o'clock on Saturday, October 6th.

SMITH—BIRKETT.—The marriage of the Hon. Hubert Constantine Smith, R.F.C., second son of Lord and Lady Colwyn, of Queen's Lodge, Colwyn Bay, and Miss Marjorie Methwold Birkett, daughter of Mr. and Mrs. Arthur Birkett, of 22, Warwick Gardens, W., took place at St. Mary Abbotts, Kensington, on Saturday. The Bishop of Lincoln officiated, assisted by the Rev. H. H. Lowe, vicar of St. Barnabas, Kensington, and the Rev. Herbert Allen, curate of the church.

SPEED—DERING.—The marriage of Capt. Douglas Speed, K.R.R.C. and R.F.C., son of Major and Mrs. Elmer Speed, and Miss Myrtle Dering, second daughter of Sir Henry and Lady Dering, took place at St. Paul's, Knightsbridge, on Oct. 4th. The ceremony was performed by the Rev. Dr. Springett, assisted by the Rev. S. G. H. Sargent, rector of Knowlton, Dover, and the Rev. H. F. Speed, uncle of the bridegroom.

THORNE—THURSBY.—On Oct. 3rd, at Castle Rising, Lt. Arthur Bussel Thorne, R.F.A., attd. R.F.C., second son of Capt. and Mrs. F. G. Thorne, of Heacham, Norfolk, was married to Katherine Gwentholen, eldest daughter of the Rev. and Mrs. H. E. Thursby, by the rector, father of the bride, assisted by the Rev. G. Ellerby, rector of Runcorn.

Births.

GOODE.—On Sept. 25th, at Lausanne, Switzerland, to the wife of Capt. H. M. Goode, R.F.C.—a daughter.

PRATT.—On Sept. 28th, at 38, Nevern Square, S.W., to Grace Marian, wife of Capt. G. B. Pratt, R.F.A. and R.F.C.—a daughter.

Lt. George Leal, R.F.C., son of Mr. George Leal, of Johannesburg, has been reported missing after flying on the Western Front. He went through the S.W.A. campaign with Col. Taylor. He is very well known in connection with the Transvaal Artillery Corps, and by profession is an accountant with Mr. F. W. Diamond, Johannesburg.

* * *

The special correspondent of the "Morning Post," writing from the British front on Oct. 5th, says:—

Aeroplanes and tanks did useful work in spite of the extremely unfavourable conditions during the fighting on Oct. 4th at Broodseinde Ridge. A strong wind forced the fastest machines to travel very slowly when beating against it, but some scouting work was done by skilful pilots, and they made low flights over the demoralised German infantry in the back areas. I heard of one aviator who kept aloft most of the morning over the German lines, absolutely ignoring the efforts to bring him down. He was fired at constantly by all kinds of guns and by the infantry in the shell-holes, but kept steadily on his way until his machine had been nearly shot to pieces. Finally, with wings riddled and holes in his petrol tank, but still unwounded himself, he made a forced descent, landing just within our lines. Though badly bruised and almost unrecognisable, and with a broken, swollen nose, he walked to headquarters, made his report, and to-day begged to be allowed to go out again instead of remaining in hospital. Some of the German aeroplanes which braved the gale were brought down by rifle and machine-gun fire from our lines. [So apparently the Germans were not less brave in attacking close to the ground.—Ed.]

FRANCE.

Official Communiqués.

Oct. 2nd.—German aeroplanes attacked again last night (Monday) the town of Dunkirk. The bombardment, which was very violent, caused serious material damage. It is reported that there were a number of victims among the civilian population.

In reprisal for the bombardments carried out by the Germans on Dunkirk and Bar-le-Duc, our aviators on the night of October 1st-2nd dropped bombs on the towns of Stuttgart, Trèves, Coblentz, and Frankfurt-on-Main.

In addition, our bombarding aircraft carried out numerous flights, in the course of which 2,120 kilograms (about two tons) of explosives were dropped on the depots at Roulers and 6,000 kilograms (about six tons) on the railway stations of Metz-Sud, Woippy (near Metz), and Thionville (17 miles north of Metz), the aerodrome at Chambley (14 miles west-south-west of Metz), the bivouacs of Spincourt (17 miles north-east of Verdun), and Tilly, and the dumps at Longeau Farm, where a violent explosion was observed.

During the day on October 1st two German aeroplanes were brought down by our pilots and four driven down out of control.

Last night German aeroplanes dropped bombs on Toul. Several casualties are reported.

Oct. 3rd.—Our bombing aeroplanes on the night of Oct. 1st-2nd and during the day yesterday (Tuesday) bombed the railway station of Freiburg (in Breisgau), the factories of Völklingen (north-west of Saarbrücken) and Hoftenbach, and the railway stations of Brieulles, Longuyon, Metz, Woippy, Arnaville (south-west of Metz,) Maizières-les-Metz, Thionville, and Saarburg. Seven thousand kilogrammes (nearly seven tons) of explosives were dropped during these various expeditions.

As a reprisal for the bombardment of Bar-le-Duc two of our aeroplanes dropped bombs on the town of Baden (which lies about 95 miles east of Nancy).

Oct. 4th.—As a reprisal for the bombardment of Bar-le-Duc our aircraft bombarded Frankfurt (about 150 miles north-east of Nancy) and Rastatt (about 90 miles east of Nancy).

Oct. 6th.—Army of the Orient.—Allied aeroplanes bombarded the enemy establishments north of Ghevgeli (Vardar) and near Resna (north of Lake Prespa).

Oct. 8th.—Army of the Orient.—In the region of Doiran two raids supported by aircraft penetrated the enemy's lines and destroyed various works.

* * *

According to an Elberfeld telegram to the "Cologne Gazette," Oct. 3rd, the aviator who shot down Capt. Guynemer was Flt. Lt. Wissemann, who himself has since been killed.

In his last letter to his parents, in which he described how he brought down Capt. Guynemer, Lt. Wissemann wrote:—"Do not be anxious, as I can never have a more dangerous enemy."

* * *

A message from Paris on Oct. 6th stated that during the month of August 84 flights were made by French naval airships and 3,087 by naval aeroplanes and seaplanes. Twelve attacks were made upon submarines, one during the night; there were four combats in the air, and six bombardments of enemy naval bases were carried out.

GERMANY.

Official Communiqués.

Oct. 2nd.—Last night London, Sheerness, Ramsgate, and Dover were once again attacked by our aviators.

Oct. 3rd.—The bombing attack made by our aviators during

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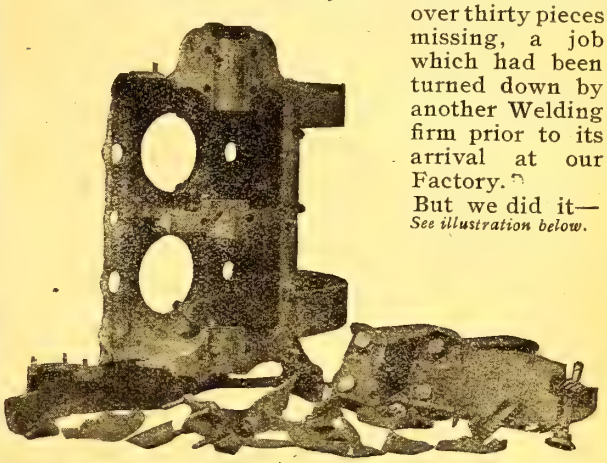
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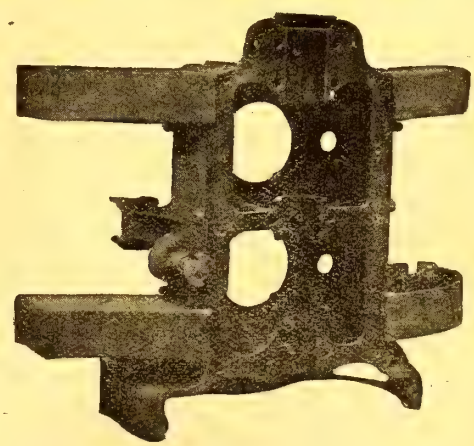
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the night of October 1st-2nd on London, Margate, Sheerness, and Dover, had a visibly good effect. Numerous bombs were also dropped with visible success on the English ports and principal points for traffic in Northern France.

Western Theatre of War.—In an aerial fight Lieut. Gontermann shot down his 39th opponent and First Lieut. Berthold his 28th.

Oct. 6th.—The stormy weather limited aerial activity. Five enemy aeroplanes were shot down. Lieut. Müller gained his 29th aerial victory.

Oct. 7th.—Photographs taken by our aviators confirm the conclusion that our bomb attacks on the fortress of Dunkirk caused great destruction in several quarters of the town, especially to the harbour, warehouses, and railway works. Considerable hindrance will have been caused thereby to the English reinforcements.

* * *

A Berlin telegram of Oct. 4th says:—

Enemy aviators during the night of October 2nd attempted in numerous flights to make attacks on German soil. The attacks did not produce results of any kind. An enemy aeroplane came as far as the neighbourhood of Stuttgart and dropped at Feuerbach six bombs, which caused small damage but no casualties. The open town of Frankfurt-on-Main was attacked by about ten aviators, who came from a southern and western direction. Most of the bombs fell without effect outside the town. Within the city boundary thirteen places have thus far been counted where bombs fell. The bombs were dropped mostly in streets and open places, and the damage was small. Five persons were slightly injured and nobody was killed. One of the enemy aviators who during the night of October 2nd attacked Frankfurt was on the return flight forced to descend by German anti-aircraft measures. He is a serjeant, and his machine was a Sopwith one-seater, No. 128.

The Lorraine industrial region was subjected to numerous attacks, which, however, as usual, thanks to our effective measures of defence, had only slight success. Only one enemy aviator again succeeded in penetrating into the region of Dortmund. He dropped on the railway at Dorstfeld (Dortmund South) six bombs which damaged the tracks In this attack one person was killed.

Some attacks during the night of October 2nd were also directed against Rastatt, Baden-Baden, and Tübingen. Three bombs were dropped on the first two places, causing some material damage. For what purpose the French make these attacks on open German towns is unclear. In Rastatt there are no military objectives, and the attacks on Tübingen and Baden-Baden can only be considered as the outcome of a blind desire for destruction.

The sanatoria at Baden-Baden and the hospitals at Tübingen contain numerous severely wounded men who are there seeking recovery. Even the French will not dare to assert that attacks on hospitals far behind the front are of military necessity. By such barbarity the will to persevere can only be strengthened in the German people.

* * *

The "Frankfurter Zeitung" reports that on Sept. 30th several enemy aviators flew over Frankfurt. They were heavily fired at by anti-aircraft guns. They dropped a considerable number of bombs on Frankfurt and the environs. In the town itself, according to present information, eighteen bombs were dropped, "causing slight damage and injuring five persons." The raid, which began at 10.30 p.m., ended at 11.35 p.m.

* * *

Serious labour trouble is reported at the aeroplane factories in the Berlin districts. Work has been stopped for ten days, some 40,000 workmen being involved. The reason for the strike is due to bad food and insufficient wages. The demands of the workmen regarding pay have been granted, and increased bread rations have been given. Work was resumed on Oct. 3rd.

* * *

A Stuttgart telegram to the "Frankfurter Zeitung" says that on Sept. 30th, between 11.35 p.m. and 12.45 a.m., Stuttgart was twice attacked by enemy aeroplanes. The majority of the bombs, the message says, fell on streets and open squares, causing no considerable damage apart from broken windows and the smashing of roof tiles. Two men were killed and four women and one boy wounded.

* * *

The special correspondent of the "Morning Post," writing from the British Front on Oct. 2nd, of the death of Lieut. Voss, says:

"The body of Voss, the famous German aviator, who was recently reported missing in a German communiqué, has been found behind the British lines. He was killed in a battle with a British aviator. . . . While patrolling at a height of nearly a mile and a half with other planes, the British aviator was attacked by a triplane and another machine. Voss was the pilot of the former."

After describing the fight, he adds:—

"Suddenly Voss swerved, and the planes nearly came into collision as he dropped to avoid a sudden burst of machine-gun fire. Our man saw him gliding westward with his engine shut off, and dived after him, pumping bullets into the triplane. It reeled, dropped, and disappeared. The victor sailed away, and it was not until later that the broken German machine was found on the battlefield, with Voss's body still wedged in the pilot's seat."

[It is notable that this is the first mention of a German triplane. If the statement is accurate, the fact is rather remarkable.—Ed.]

* * *

Mr. W. G. Shepherd, the special correspondent of the United Press of America, writing to the "Daily Express" from Stockholm, on Oct. 6th, says:—

During the past fortnight the Germans have been using Gothas with four engines, each of 260 horse-power. These machines are provided with fuel for a flight of ten hours, and carry five men—two pilots, two gunners, and a captain, who controls the wireless apparatus.

[If not true at the moment this seems a useful hint as to the future, and should be noted for reference.—Ed.]

* * *

According to a message from Cologne (via Amsterdam, Oct. 3rd) aviators appeared over that city during the night of Oct. 2nd. No bombs were dropped. Anti-aircraft guns shelled the aeroplanes, but none of them was hit. The population was greatly alarmed.

* * *

The "General Anzeiger" of Essen reports on Oct. 1st that under military orders all lights must be darkened in the Governmental district of Düsseldorf and throughout a great part of Westphalia. Similar protective measures against possible air attacks have been taken at Wilhelmshaven and other places in Western Germany.

* * *

Mr. H. Warner Allen, writing on Oct. 2nd from the French Front in the "Morning Post," says:—

According to the latest information, the Germans are carrying out trials with a "Tank" armed with a seventy millimetre gun and two maxims. The German "Tank" is provided with a pointed beak forward and has an armoured conning tower rising from its roof. It is reported that its armour comes down very low in order to protect the "caterpillars," which are almost entirely hidden by it.

* * *

A message from Berne, dated Oct. 2nd, states that the German public, according to German newspapers, rejoices over the fact that English towns have been bombed from German aircraft three times in one week. The Leipzig "Neueste Nachrichten," the influential organ of the National Liberal Party, recounts a successful visitation, "to quote an ironical expression used in the official communiqué," of English towns by German aircraft, and observes:

"We can be proud of the achievements of our aviators, who, in spite of great difficulties and dangers, continue to cross over to England and prove to the English that they are not safe from us even in their own country. Furthermore, every German air raid on England considerably weakens England's military strength, although, in accordance with old custom, the English newspapers always endeavour to hide the effects produced by our air bombs."

RUSSIA.

Official Communiqués.

Oct. 2nd.—On September 29th, in the Brody region, an enemy machine was shot down by our machine-gun fire, and yesterday another enemy aeroplane was shot down by our rifle fire in the Baranovitchi region. Pilot-Ensign Kamensky brought down a captive balloon.

In this region one of our aeroplanes, manned by Captains Gridnevsky and Radtchenko, fell from a height of 40-50 yards, and took fire. Both aviators perished.

In the Molodetchno region one of our machines returning from a scouting raid took fire, and Lieut. Migay and Ensign Rahkmaninoff were killed.

Oct. 3rd.—Baltic Sea.—On October 1st, during the night, the enemy undertook several air raids on Tserel (southern end of the island of Oesel, north of the Gulf of Riga) and dropped a few bombs, which set on fire one of our magazines. Explosions followed. Several officers and sailors who worked to extinguish the fire perished.

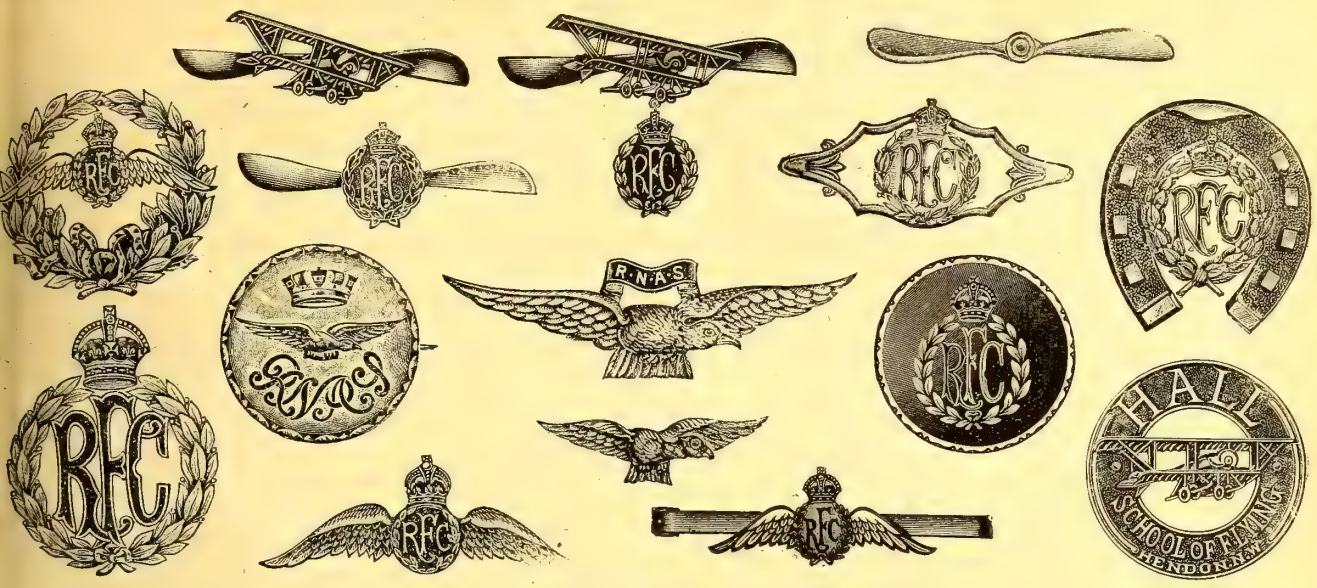
As reprisals our aviators dropped bombs on the camps situated on the Courland coast.

During the day enemy seaplanes tried once more to approach Tserel, but our aviators ascended to meet them, forced them to turn back, and to drop their bombs in the sea.

On October 1st, on the south-western front, we had three aerial engagements with enemy machines. Our giant aeroplanes of the Murometz type dropped several tons of bombs on the village of Korostkov, north-west of Husiatyn.

Oct. 4th.—An enemy aerial squadron attacked the village of Krasno, south-east of Grshimalovka. Eighty bombs were dropped, three privates being killed and four wounded. Several horses were also killed.

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KINGSTON

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Oct. 5th.—In the evening of October 3rd one of our aeroplanes, whilst descending, preparatory to entering an aerodrome, crashed to earth. Capt. Konshin was severely wounded, while the observer, Sec. Lieut. Gollias, died as the result of his injuries.

On October 4th, between 4 and 6 a.m., our machines dropped bombs on enemy camps in the Smorgoni region.

Oct. 6th.—On October 4th, at 1.30 p.m., enemy aeroplanes raided the town of Galatz. As the result of the dropping of bombs casualties occurred among the civilians and soldiers.

Oct. 7th.—On the Caucasian front in the direction of Sivas a squadron of three of our aeroplanes made a raid in the region of Rifaji, where bombs of a total weight of more than four hundredweights were dropped.

Oct. 8th.—In the Tchik Seredina region (Rumania) our aviators bombarded the village of Nikloch and Palanka Station. The bombs set on fire a sawmill, the station, and some stones. A magazine exploded.

ITALY.

Official Communiqués.

Sept. 30th.—The Admiralty Staff issues the following communiqué :—

On the night of Sept. 29th, while squadrons of our Caproni aeroplanes were effectively carrying out a fresh attack on the naval base at Pola, enemy aeroplanes dropped bombs on the neighbourhood of Ferrara, causing some damage, but, fortunately, no victims.

One of our groups of destroyers on patrol duty sighted a little before midnight a group of enemy destroyers supporting the seaplanes which had attacked Ferrara. Our vessels determinedly attacked the enemy, and seeing him immediately turn tail pursued him, shelling him until they reached the barrage of the Parenso batteries. Explosions were clearly observed on the enemy's vessels, which were hit again and again. Our vessels sustained no damage.

Almost at the same time another squadron, between 10 p.m. and midnight, attacked the South Adriatic coast in the district between Monopoli and Lecce, dropping many bombs on Ostuni and Brindisi. At the former place no damage was done, and at the latter, which was the particular object of attack, the material damage was unimportant, while five persons were killed, including two civilians, and twenty-two wounded.

The attack was received with violent anti-aircraft fire, which, besides limiting the effectiveness of the enemy's attack, brought down one hostile seaplane. The two aviators were taken prisoners. On the night of Sept. 28th enemy seaplanes, coming from Salvore and Trieste, bombarded the Aquileja-Villa Vicentina-Palma Nova district.

As an immediate reprisal, four of our seaplanes ascended and dropped on the military establishments of Capo di Salvore 18 explosive shells and several incendiary bombs. They returned undamaged to their base, in spite of violent anti-aircraft fire and the activity of the searchlights.

Oct. 3rd.—Air activity was lively. During the day one of our squadrons carried out a bombardment on the railway station of Grahovo (Bazza Valley, north-east of Gorizia). Last night in two successive raids the military objectives of Pola were bombarded with four tons of projectiles and greatly damaged.

Two enemy machines, brought down by our aviators, fell north of Auzza (Middle Isonzo) and near Podmelec (Bazza Valley).

Oct. 4th.—An enemy aeroplane attacked by one of our aviators above Auzza (Middle Isonzo) was forced to land in our lines; the pilots were made prisoners.

Oct. 5th.—During the night of Oct. 3rd and 4th one of our bombarding squadrons, composed of a large number of machines, audaciously flew over the naval base of Cattaro. The enemy, who was surprised, replied by a violent fire, which was badly regulated. Our aviators on several occasions and with visibly efficacious results hit torpedo-boats and submarines lying in the base.

* * *

A semi-official Note published in Rome says :—

"The only victims of the aerial raid carried out by the Austrians during the night of Sept. 29th-30th on the Lower Isonzo, announced in the Italian communiqué of Oct. 1st, is the noble Lady, Marie, widow of Clariciari, née Countess Ateems von Heiligenkreutz, who is related to the highest Austrian aristocracy.

"These are the laurels gathered by the Austrians during the course of their raids on Italian inhabited centres. We ourselves have always refrained from such barbarous acts, but the persistence of the Austrians in seeking to cause victims amongst the civil population will eventually lead to our adopting solemn reprisals. It is certain that the Italians do not lack any means to do this, as is known quite well by the Austrians."

* * *

The Rome newspapers of Oct. 2nd supply details of the air raid at Brindisi on the evening of Sept. 27th. It was 8 p.m. when the sirens gave warning of the attack. From then until 9.30 p.m. the firing of anti-aircraft guns was incessant, the searchlights meantime playing over the sky. The attack was renewed three times, probably by three different squadrons. The bombs which were dropped caused the death of five victims, of whom two were civilians, and injured 22. No military objective was hit.

A huge machine was brought down by the anti-aircraft guns. The aviators, who were made prisoners, are a naval captain and an infantry lieutenant, both Austrians. The machine was recovered by an Italian torpedo-boat. On board were found, besides bottles of brandy and wine, a loaf made of some vile substance whose nature could not be determined. An impressive funeral was accorded to the victims of the raid.

* * *

The Rome newspapers of Oct. 7th give details of a serious bombardment of Cattaro. In this the poet D'Annunzio commanded a group of Caproni aeroplanes, and the attacking machines carried 5,000 kilogrammes of explosives.

Mists prevented the enterprise till the third night, and on their way the aviators were subjected to fire from Mount Loveen and other forts. The attack was delivered from a height of 13,000 ft. by the light of star shells.

All the objectives were reached. Hits were observed on submarines, torpedo destroyers, docks, factory and military works, and great fires broke out. In two hours' time the aeroplanes had returned safely

U.S.A.

A message from Washington on Oct. 5th says that Mr. Baker, Secretary of War, announces that the 20,000 aeroplanes authorised by Congress recently are actually under construction, and that the necessary motors are now being built.

Mr. Baker adds that the whole aircraft programme is so co-ordinated that when the machines and their motors are completed, trained aviators, as well as machine-guns and other equipment, will be waiting, and he remarks :—"When this nation's Army moves up to participate in the fighting the eyes of her Army will be ready." The types of aeroplanes cover the entire range from light training machines to powerful bombing and battleplanes.

TURKEY.

Official Communiqués.

Oct. 1st.—Euphrates Front.—Early on Friday morning the enemy subjected to the fire of guns of various calibres for several hours the positions which had already been evacuated by our advanced troops. During these operations four enemy aeroplanes were brought down behind their own positions.

Oct. 5th—In the Gulf of Saros (north of the Gallipoli Peninsula) a British machine of the latest type was driven down by our fire. The three occupants were taken prisoners.

[It will be interesting to find out what really happened.—Ed.]

BELGIUM.

Official Communiqués.

Oct. 4th.—In the last two days our aviation service carried out 47 flights, several of which were by night, for the purpose of dropping bombs in reprisal for bombardments of our rear.

* * *

The "Belgisch Dagblad" reports that on Sept. 30th an Allied aviator dropped two bombs on a train consisting of forty cars filled with German soldiers on their way from Bruges to Ghent. The train ran off the rails. Many soldiers were killed or injured.

The same paper confirms the news that the sheds and aeroplanes at the St. Denis Westrem aerodrome near Ghent were destroyed by aerial attacks.

* * *

On Oct. 1st a siding at the Meirelbeke Station, near Ghent, was completely destroyed by bombs dropped by Allied aviators.

The "Courrier de la Meuse" learns that the railway station at Eecloo has also been totally destroyed in the same manner.

* * *

The "Telegraaf's" (Amsterdam, Oct. 7th) frontier correspondent says that last week the bombing attacks of Allied aviators made terrible havoc on the Flemish coast, whither many German soldiers had been sent to rest. Heyst, Knocke, Westcappelle, Ramscappelle, and Lisseweghe shook to their foundations. Heavy bombs fell on the Yser road bridge of Zeebrugge, and ten Marines were killed and many wounded. Others fell on Heyst and near Het Sas. Three villas collapsed, and wounded soldiers were afterwards removed from the débris.

On Oct. 2nd bombs fell near Zeebrugge Lock, the innermost gates of which warped. Great openings were also made in the quay walls, and six torpedo-boats lying between the locks and the Solvay factory were shut up in the canal. Soldiers were obliged to work day and night on the lock and quay, and it was not until two days later that the vessels were liberated.

According to a Sluis message Allied aviators bombed the aerodrome of St. Denis Westrem on Sept. 30th, when fifteen German machines were destroyed. One bomb struck the railway line and one the Nieppe bridge. The first bomb fell just before the

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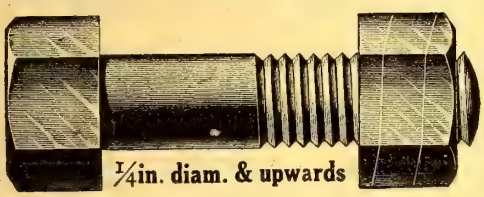
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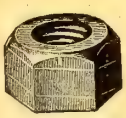
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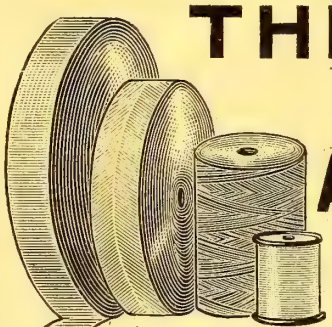


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DELIVERY FROM STOCK.

arrival of a military train, with two engines and 45 carriages, carrying soldiers on leave from the front, and made a large hole on the railway track. The first engine fell into the hole, with the result that several carriages were derailed. The train was then bombed, and several casualties resulted.

* * *

The "Telegraaf" correspondent on the Belgian frontier telegraphed on Oct. 2nd: "At 11 o'clock on Sept. 30th aircraft bombarded the railway communications of Ghent, inflicting great damage and hindering the traffic. Aircraft bombarded Zeebrugge on Sept. 29th and 30th and on Oct. 1st. On Oct. 2nd a squadron of from 20 to 25 machines flew over Flanders."

HOLLAND.

A telegram from The Hague states that an aeroplane of unknown nationality dropped two bombs on Sluis on Oct. 1st. Two houses were destroyed, but no lives were lost.

* * *

It is officially stated that the German Government has apologised for the act of a German cadet-aviator in flying over Dutch territory on August 9th. It is explained that he lost his way in the clouds, and that on discovering he was over Eindhoven he returned by the shortest route to German territory.

* * *

The Dutch Serjeant Lok, who shot down the German aeroplane on August 18th, causing it to descend at Beerta, in the Groningen province, has received a testimonial consisting of a gold watch and chain and £54 subscribed for by 1,225 persons.

* * *

The "Handelsblad" (Amsterdam, Oct. 2nd) reports that 12 large aeroplanes of German make for the Dutch Army have arrived at Bentheim (Hanover), where they will be taken over by Dutch flying officers.

[It seems remarkable that Germany should be able to export aeroplanes to neutrals when we cannot fully supply our own needs. But perhaps they are obsolete types, and the Germans think it better to sell them than to burn them according to the English fashion.—Ed.]

THE FIELD MARSHAL'S OPINION.

Mr. H. Warner Allen, writing in the "Morning Post" from the French Front on Oct. 5th, says:—

It may be some slight consolation to those English people who have been suffering from the perpetual German air raids to have the Allies' air supremacy on the Western front confirmed from the pen of Hindenburg himself. In a captured document signed by the German Field-Marshal great stress is laid on the necessity of using the air forces of Germany with the utmost economy.

"Recently on the principal fighting fronts it has seemed that the enemy was trying to husband his aerial strength for pitched battles in the future. We should be making a great mistake if we overworked and exhausted our aerial units, which are inferior in number to those of the enemy, by employing them several times on a single day. . . . We cannot prevent the enemy's aviators from flying continually over our lines. The infantry and artillery must not be too nervous. Let us use our aeroplanes sparingly on calm days, in order that we may call upon them for a great effort on a day of crisis. . . .

"Our fighting-plane squadrons, which are far from numerous, must not be equally distributed over the whole of the front. They would always have to fight against odds, and would suffer losses out of proportion with the situation. They must be grouped sometimes here, sometimes there, so as to prevent the enemy's observation for a few hours at least, and make our own observation possible."

"In the meantime the French Air Service has not been idle. In the months of July and August the French fighting planes destroyed 94 enemy machines besides bringing down 99 machines in the enemy's lines, a large number of which were certainly destroyed. Six German kite balloons were brought down in the same period. During July the French bombardment squadrons made 145 daylight raids, in the course of which they dropped over eight tons of explosives, and 261 night raids, with over 48 tons of explosives. In August they made 233 daylight raids, with over nine tons of explosives, and 265 night raids, with nearly 41½ tons of explosives.

A GEOGRAPHICAL ERROR.

A message from Paris to the "Morning Post," dated Oct. 6th, says:—

"The Committee appointed before the war to arrange for the erection of a monument to Wilbur Wright has decided to proceed immediately with the work, and it is hoped that arrangements will shortly be made for the monument to be erected at Mons."

[It would be reasonable to erect a monument to the British Army at Mons, but why to the late Mr. Wright? Perhaps, however, the "Morning Post" man wrote "Le Mans," where Wilbur Wright first flew in Europe, and the sub-editor thought he knew better.—Ed.]

THE R.N.A.S. COMFORTS FUND.

On behalf of the Royal Naval Air Service Comforts Fund, Mrs. Sueter hopes all those who have so generously helped during the last three years will continue their kind support for the coming winter. Mrs. Henry Balfour, Langley Lodge, Headington, Oxford, will gratefully receive and acknowledge parcels of warm comforts. Donations should be sent to the Hon. Treasurer, R.N.A.S. Comforts Fund, London City and Midland Bank, 129, New Bond Street, London.

It seems hardly necessary once more to emphasise the hardships under which the ratings of the Royal Naval Air Service operate. They are stationed in every hole-and-corner place from the torrid to the frigid zones, generally far away from the amenities of human society; often, though necessarily, without leave for periods exceeding a year; and anything that one can do to contribute to their creature comfort or happiness is but the smallest indication that one can give of one's gratitude for their unselfish self-sacrifice.

In addition to cash contributions, gifts of the following articles will thankfully be received—mittens, mufflers, jerseys, woollen helmets, socks (dark blue or khaki only), and games, books, etc.

The fund is managed by a committee of responsible ladies, namely, Mrs. Henry Balfour, Mrs. Beuttler, Mrs. DelaCombe, Mrs. Edmonds (Hon. Secretary), and Mrs. Sueter (Hon. Treasurer).

During its existence, of nearly three years, the fund has been administered capably and economically, and one does not hesitate to recommend all who have the welfare of the men of the Royal Naval Air Service at heart to support liberally its work in the coming winter.

THE R.F.C. HOSPITAL.

The Johannesburg Branch of the Over-Seas Club has sent a contribution of £3,826 in response to the Club's appeal on behalf of the Royal Flying Corps Hospital.

R.F.C. PAY

Regulations governing the issue of Flying Pay to officers of the Royal Flying Corps are amended by Army Orders issued on Oct. 5th in the following particulars:

An officer, whilst undergoing instruction in flying, shall receive continuous flying pay at the rate of 4s. a day in addition to the emoluments of his rank or appointment.

Flying pay under Article 222 may be issued continuously to an officer who is a qualified aeroplane or balloon pilot and graded as a flying or balloon officer, flight or squadron commander, during such time as he is employed on duty which involves flying. It may also be continued up to a limit of three months during periods of special Royal Flying Corps duty not involving actual flying.

An officer while undergoing a course of instruction in aerial observation duty shall receive continuous flying pay at the rate of 3s. a day in addition to the emoluments of his rank or appointment.

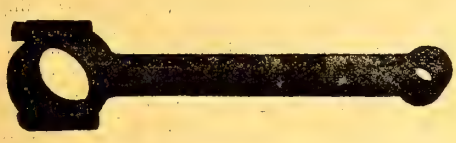
It is laid down, however, that the continuance of flying pay while on special duty not involving flying does not apply to officers employed on ground duty which unfits for flying, but only to specially authorised instructional tours, etc., on Royal Flying Corps duty undertaken by officers who are at the time in receipt of flying pay.

LONDON'S DEFENCES.

Lieut.-General Sir Francis Lloyd, the Controller of the Defence of London, addressed a meeting at Poplar Town Hall on Oct. 8th on the position in regard to air raids on London. He said that when the Zeppelins came we were absolutely powerless, and had the Zeppelins known what they could do—he presumed that they did not—they might have unloaded bombs on London to a far greater extent than they had. Zeppelin attacks had up to the present ceased. It was possible they might come again, but it seemed as if they would not because of the great danger of losing them.

Referring to the recent night raids, Sir Francis said that we suffered nothing then in comparison with the daylight raid of one Saturday morning. He was not going to say that we had arrived at a period when we could laugh at anything that was against us. We must make the most absolute endeavour to beat this dread thing, for one woman's life was as much to her family as thousands of women's lives to thousands of families. The air defence of London was in the charge of one of the ablest engineers, who for many months past had exercised his brain in trying the best that could be done with the materials at his disposal to defeat the invaders. That officer directed the barrage which went up—it was not quite clear how high, but as high as the enemy aeroplanes could go.

With regard to the immediate future, Sir Francis said: "We have no experience yet of the enemy coming on dark nights. I very much doubt his being able to do so, but the possibilities of the future are infinite, and it is impossible to say what he may



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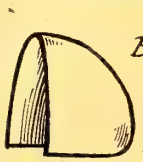
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do. I am glad to say, however, that at present so far as we know we are pretty safe on dark nights and with bad weather."

[It would certainly be unwise to give an opinion till we see what happens on calm, starlit winter nights.—Ed.]

A member of the audience inquired whether the country was being humbugged over reprisals, and whether German influence was too strong for the Government to institute reprisals? Why had the Government allowed all the moonlight to go without taking reprisals?

Sir Francis Lloyd replied that he was not a politician, nor was he in the Government. They had heard what the Prime Minister said the other day: "We will give them hell." Sir Francis added: "I hope he means it. I fancy he does; but I have nothing to do with it. I do fancy, though, that there is every intention of having a go at them now straight away. Recently we dropped hundreds of tons of bombs behind the lines, and I expect that before long we shall hear of very big raids."

THE QUESTION OF REPRISALS.

A meeting "in support of an increased air service," called by the National Imperial Association, was held in the Central Hall, Westminster, on Oct. 3rd. Mr. F. M. Russell Davies (Chairman of the association) presided, and the speakers were Mr. W. Joynson-Hicks, M.P., Sir W. H. Cowan, M.P., Mr. J. H. Havelock Wilson, president of the Sailors' and Firemen's Union, and the Mayors of Stepney and Ramsgate.

The Chairman, after paying a tribute of gratitude to the men of the Royal Flying Corps and the Royal Naval Air Service (the order of precedence is his) said that the meeting was not called to criticise those responsible for the conduct of the war, but to support them in any steps they took for strengthening the Air Services and carrying the war into the enemy's camp. It was also a meeting to warn the responsible authorities that unless they took precautions to perfect the Air Services and to provide a sufficient supply of aeroplanes and trained flying men, they would be called to account when the proper time came.

Mr. Joynson-Hicks complained that the Government had lagged behind public opinion, and had not been ready to visit extremities on Germany. Despite newspaper warnings the enemy had been allowed to take the lead in the matter of raids. What the Germans had done we could do. The Gotha machine was only a copy of one of ours.

[This last statement is inaccurate in point of fact. The Gotha is not an imitation of any British aeroplane, although it is true that there are British bombing aeroplanes which are better than the Gotha.—Ed.]

GENERAL SMUTS AND REPRISALS.

On Oct. 4th the Association of Chambers of Commerce entertained General Smuts at luncheon at the Connaught Rooms, after which he made a somewhat lengthy speech, chiefly on the subject of reprisals.

General Smuts was optimistic as to the outcome of the war, and was certain that those in authority in Germany knew they were beaten men.

Nevertheless, it was necessary that air raids on England should be met by an air offensive into Germany, much though he regretted the necessity.

In the opinion of General Smuts such action was justified. Although he compared British bomb casualties very favourably with street accident casualties, he apparently expects more devastating results from our bombs.

It is just a little puzzling to contemplate this distinguished soldier's apology for the policy of bombing German towns. In his grief for the German populace he quite forgets to emphasise the great strategic factor which a nation's joy or panic contributes to the success or failure of its armies in the field.

AIR RAID WARNINGS.

The Mayors of the metropolitan boroughs held a specially convened meeting at the City Hall, Westminster, on Oct. 4th, to discuss the situation caused by the air raids. Sir George Welby, Mayor of Westminster, presided and most of the other Mayors were present. The following resolutions were adopted:—

1. That the day system of warnings should be extended throughout the night.

2. That an air offensive on the largest possible scale should be undertaken forthwith against the German cities and towns without distinction.

3. That the air services of the country should be unified and placed under one responsible head.

Copies of the resolutions are to be sent to the Prime Minister, the Home Secretary, and the Commissioner of Police.

The question of warnings was discussed by the Corporation of London on Oct. 4th.

Mr. A. V. N. Neville moved that the Government be urged to institute some effectual method of giving warning of impending air raids by night. There should, he said, be ample warning everywhere in order to enable women and children to seek shelter. If something were not done to ameliorate the condition of things there would be something more than a ferment in London.

The resolution was carried, and it was decided to send a copy to the Prime Minister.

THE AMERICAN AIRCRAFT FLEET.

The "Aerial Age," New York, for September 17th, makes the somewhat daring suggestion that the big aeroplanes now under construction in America, which are destined to bomb Germany, should be flown across the Atlantic to Europe and then to some point within easy striking distance of Germany. The scheme seems to have been inspired by Major R. Perfetti, of the Special Italian Aeronautic Commission to the United States, who proposes that Caproni aeroplanes or machines of the same nature should be adopted. As an experiment, and as an example, he advocates the flying of a Caproni triplane, equipped with three 700-h.p. motors, from Genoa to Halifax, Nova Scotia, via some point in Spain, and the Azores.

Lieut. Silvo Resnati, who claims to have flown Caproni aeroplanes for a total of 2,200 hours, agrees with Major Perfetti that the flight can be made. No scheme is set forth as to whether the machines will be flown to New York from Nova Scotia or carted there, or how long the preparations will take to make. Also, no estimate is given of the percentage of losses incurred through the miscellaneous perils of this admittedly perilous feat.

Confirmation is lacking that there is a suitable 700-h.p. aero-engine in Italy, and one would like some information as to the number of pilots who would fail to strike the lumps of rock in the Atlantic called, by courtesy, the Azores, and so perish miserably.

The need for re-erecting American aeroplanes in Europe is certainly to be regarded as a source of annoyance, but at the present time the Atlantic passage by water is so relatively safe, despite the machinations of the German submarines, that it would be far more difficult to attempt to fly the Atlantic with large numbers of machines than to ship them across.

The problem of the crossing of the Atlantic by air is certainly one that deserves suitable research, but, at the present time, when the resources of the different countries are so severely strained to build aeroplanes in enormous numbers, capable of less amazing performances than the crossing of the Atlantic, so much publicity to the accomplishment of a feat, which is actually of secondary importance, is almost unseemly; and as the name of one famous Italian firm is so persistently coupled with these proposals, they savour too much of a publicity campaign.

Personally, one looks upon the conquest of the Atlantic as a feat deserving to be achieved for the first time in no unqualified way. The hopping across of this ocean from one to another of



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the various stepping-stones, which Nature provides, in the manner of the lady in "Uncle Tom's Cabin," who crossed the Ohio River in a series of leaps, seems but a half-baked way of achieving an accomplishment of vast historical importance.

Such a flight could undoubtedly be made by the much-advertised Italian triplanes; it could equally well be made by one of the British Handley-Page biplanes or by one of the big Porte boats, with one or two stops to pick up fuel at sea, or, for the matter of that, by a specially-faked Gotha. But one would like the attempt to be delayed until a machine is evolved which could start, say, from Plymouth and fly to New York, non-stop, and the establishment of a really big international prize, say, £100,000, should make the accomplishment of the distance, probably within a year of the cessation of hostilities.

The general conditions which it would be necessary to lay down would be that the machine should not alight from the start to finish of the journey, that both before and after its journey it should show it is capable of both starting and alighting on really rough water, and that it finish the journey in a condition which fitted it to make the return trip without structural alterations or repairs, and with no attention except as to engine and plane adjustments.

The achievement of a flight of this description would be worth fifty times the accomplishment of a qualified hop, skip, and a jump across the narrowest part of the Atlantic, and would greatly impress the traffic magnates, in whose hands commercial aviation of the future undoubtedly lies.—W. L. W.

HOSPITALITY AT THE LYCEUM CLUB.

The United Empire Circle of the Lyceum Club gave a dinner to officers of the Royal Flying Corps on Oct. 8th. Mrs. Frances E. J. Parker, who presided, in proposing the toast of the evening, said that there were no better flying men than ours in the world, and we looked on them all as heroes.

Brigadier-General Charlton, D.S.O., in replying, compared the former possibilities of flying 50 miles an hour at a height of 4,000 feet with those developed during the war of 21,000 feet at 110 miles an hour. Even if armaments were limited after the war, he said, there could be no curtailment of the commercial future of aviation. All the energy of military preparation would in that case be diverted into commercial channels, and if the interior of a continent required opening up instead of sending a punitive expedition it would only be necessary for an aviator to drop a bomb and all opposition would cease. There were also romantic possibilities connected with elopement and honeymooning, and an irate parent could be imagined raising his clenched fist to the sky. No one could say what sort of machines would be flown, so quick was the development, but he anticipated char-a-banc, lorry, racing and pleasure machines. As to when people would fly he predicted that they would fly all day and all night, and they must be independent of weather. The young would be the pilots, because flying demanded mental resolution, combined with the healthiest habit of body.

CAPTAIN LAUREATI IN LONDON.

Capt. Laureati was received at the Mansion House on Oct. 5th by the Lord Mayor, who expressed to him the congratulations of the Citizens of London. He was accompanied by Major the Hon. E. A. Stonor, of the Air Board. On leaving the Mansion House, he proceeded to the Stock Exchange, and had a cordial reception.

AN UNREASONABLE ORDER.

According to the "Daily Express," "Drivers and conductors of tramcars are forbidden to leave their cars in the event of an air raid, and the tram service must be maintained."

This order, which includes girls as well as men, is issued by the Commissioner of the Metropolitan Police, embodying Viscount French's orders.

"If there were an air raid," said a tramway official on Oct. 5th, "and the drivers and conductors of cars were to quit their posts, it would mean that the cars would be bunched up together, and hundreds of passengers would have to wait until the raid was over, or walk.

"If a bomb were to drop at Blackfriars, and a line of cars were left there, many lives might be lost, whereas if the service is continued there is less chance of being hit.

"We realise that the drivers and conductors are human, and the whole question is under consideration between the police and military. In the near future, no doubt, something will be arranged to protect the drivers as much as possible from the danger of falling bombs or shrapnel."

[This seems thoroughly unreasonable. Surely drivers and conductors have as much right to take cover as anyone else, and the passengers can take cover in the same places till the raid is over. Why should thousands of drivers and conductors be endangered just because a few dozen foolhardy people want to go on travelling. If a bomb were to drop at Blackfriars on a row of empty trams it would do no harm at all, and if the cars are running there is just as much chance of running into a bomb or a dud shell as running away from the spot where it is going to fall.—Ed.]

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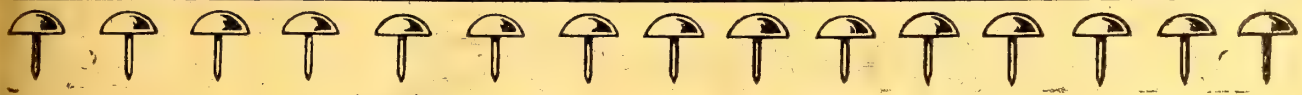
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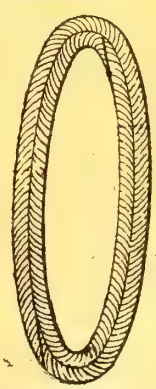
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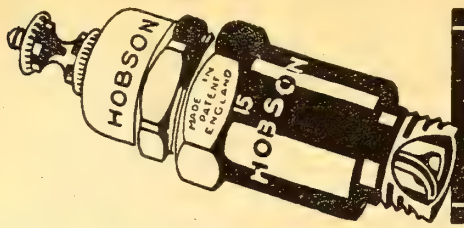


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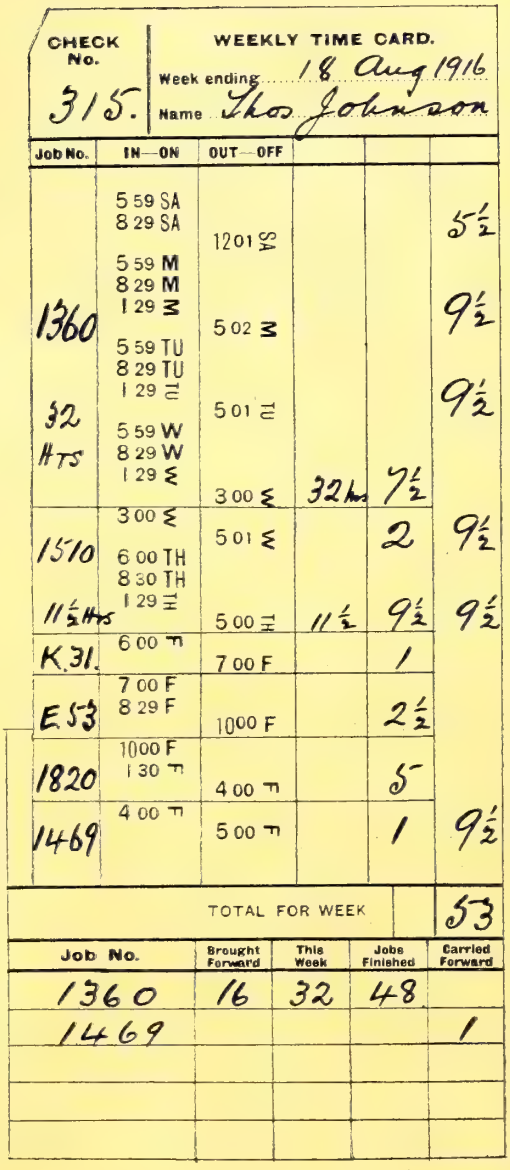
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Job No.	IN—ON	OUT—OFF			
	5 59 SA 8 29 SA	1201 SA			5½
	5 59 M 8 29 M 1 29 M				
1360		5 02 M			9½
	5 59 TU 8 29 TU 1 29 TU				
32		5 01 TU			9½
Hrs	5 59 W 8 29 W 1 29 W				
		3 00 W	32 hrs	7½	
	3 00 W	5 01 W		2	9½
1510	6 00 TH 8 30 TH 1 29 TH				
11½ Hrs		5 00 TH	11½	9½	9½
K.31.	6 00 F	7 00 F		1	
	7 00 F 8 29 F				
E.53		10 00 F		2½	
	10 00 F 1 30 F				
1820		4 00 F		5	
1469	4 00 F	5 00 F		1	9½
		TOTAL FOR WEEK			53

Job No.	Brought Forward	This Week	Jobs Finished	Carried Forward
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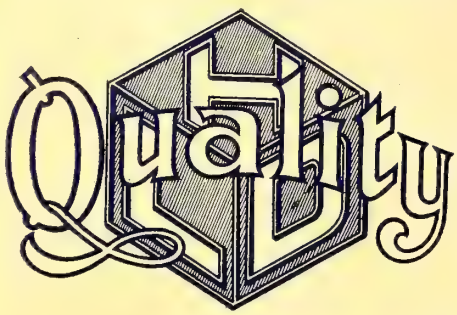
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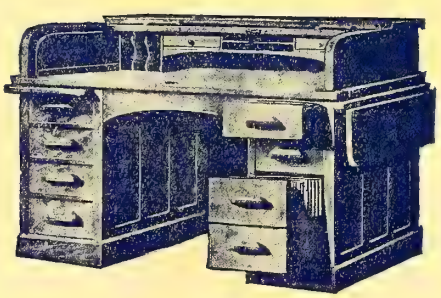
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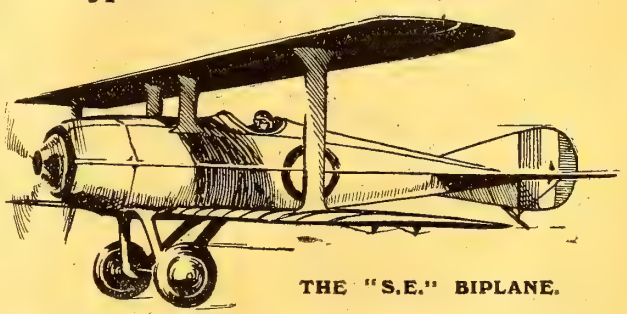
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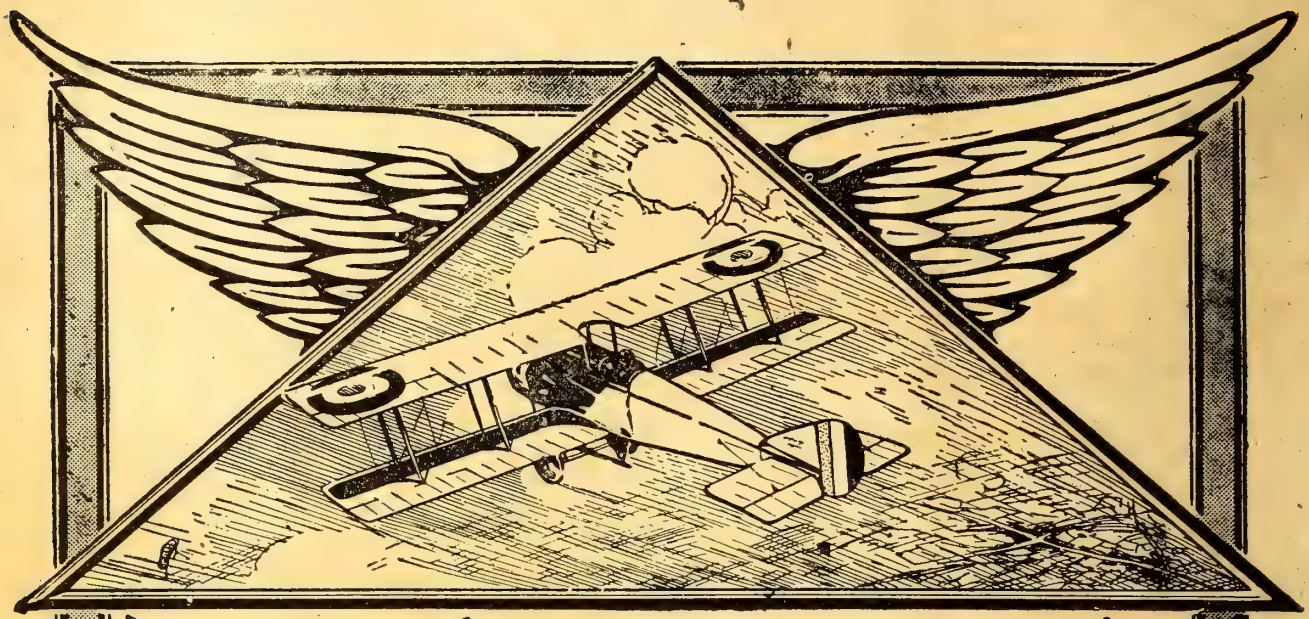
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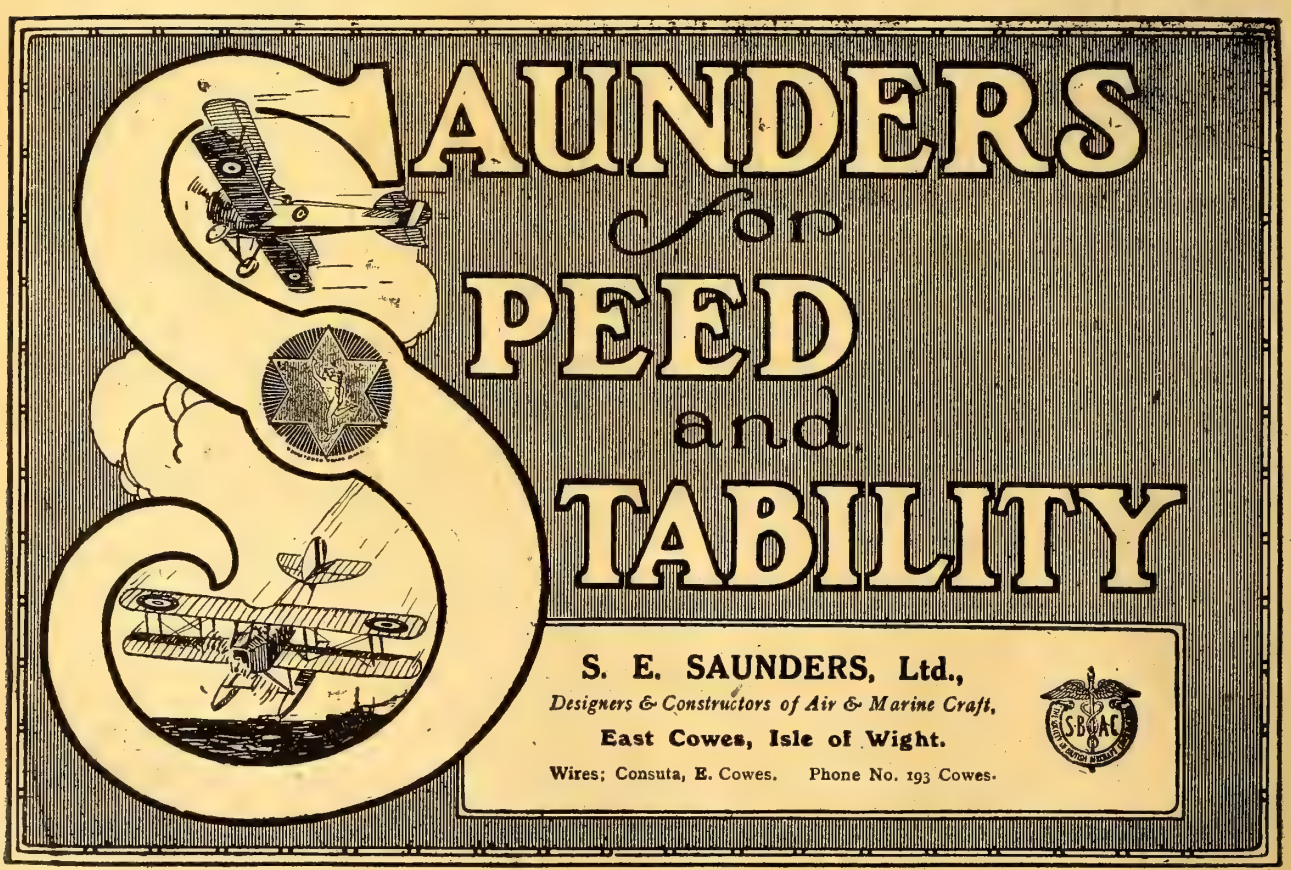
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The AEROPLANE

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On the Directorate of Military Aeronautics.

The official announcement in Saturday morning's papers regarding the changes in the Directorate of Military Aeronautics—an announcement which will be found in its proper official form in its proper place under "War Office Communiqués"—must have been rather startling to those who were not much behind the scenes. Still, even to them it must have been evident that Major-General J. M. Salmond, C.M.G., D.S.O., was marked down for further distinction, in view of his rapid advancement during the past three years. And it is certain that no other appointment to the post vacated by Lieut.-General Henderson could have been more generally welcomed by both officers and men of the Royal Flying Corps.

From his earliest days in the R.F.C., as an Instructor at the newly formed Central Flying School, General Salmond has been universally popular, and he has the great gift of acquiring popularity while at the same time inspiring respect. His high qualities as a soldier, as proved by actual command of men in the field, are happily combined with personal charm, and his skill as a pilot with unusual organising ability. Those who served with him in the early stages of the war, and those who have worked with him in the Training Brigade (or Division, as it now is) alike bear witness to his ability to infect his subordinates with his own enthusiasm. All concerned with military aviation will accept his appointment to the post of Director-General of Military Aeronautics and to a seat on the Army Council as a happy augury for the future of the Royal Flying Corps, even if it is to become ultimately merely a branch of the great Imperial Air Service.

An Active Career.

John Maitland Salmond was born in London on July 17th, 1881, the son of Major-General Sir William Salmond, K.C.B., R.E., and was educated at Wellington. He was gazetted to the King's Own (Royal Lancaster) Regiment in March, 1901, and proceeded to South Africa, where he served in 1901 and 1902, receiving the Queen's medal, with three clasps. From 1903 to 1906 he served with the West African Frontier Force, and was promoted Captain in the King's Own on June 26th, 1910.

He took to flying in 1912, and learned to fly on a Grahame-White biplane at Hendon, his certificate being No. 272, dated August 13th, 1912. In November of that year he was appointed an Instructor at the Central Flying School, and was promoted to temporary Major, and Squadron Commander in May, 1913. He was gazetted Brevet Major on June 22nd, 1914.

He married, in 1913, Helen Amy, fourth daughter of Mr. James Forbes Lumsden, of Johnstone House, Aberdeen, but suffered the great misfortune of losing his wife on May 8th, 1916, Mrs. Salmond dying on the same day as that on which her daughter was born.



Major-General J. M. Salmond, C.M.G., D.S.O.

In the early stages of this war he commanded a squadron with marked distinction, and was mentioned in dispatches by Sir John French in October, 1914. On April 13th, 1915, he was gazetted temporary Lieut.-Colonel and Wing Commander. Later in the year he was promoted to Brevet Lieut.-Colonel and made a Companion of the Distinguished Service Order.

In 1916 he was made a Brigade-Commander, with rank as Brigadier-General, and took over the organisation of the Training Brigade at home, but prior to this he had been twice mentioned in dispatches by Sir Douglas Haig. During the present year he has been made a Companion of the Order of St. Michael and St. George, and was promoted to Major-General on the expansion of the Training Brigade to a Division.

General Salmond doubtless disbelieves in the bad luck attaching to the number 13, seeing that he was promoted to Captain on June 26th (a double 13), was gazetted Lieut.-Col. on April 13th, owns an aviator's certificate dated August 13th, and was announced to the world as Director-General of Military Aeronautics on October 13th. On behalf of all concerned with Military Aeronautics one wishes him continued good fortune.

Another Sphere.

Lieut.-General Sir David Henderson, K.C.B., D.S.O., who resigns the post of Director-General of Military Aeronautics, which he has held since its creation, was born in 1862, and entered the Princess Louise's (Argyll and Sutherland) Highlanders in 1882. He served on the Staff in South Africa as Director of Military Intelligence, and when the R.F.C. came into existence in 1912 he was Director of Military Training, having spent much of his military career on the Staff.

On the formation of the R.F.C. he gave up the more important post of D.M.T. to become Director-General of Military Aeronautics, thus demonstrating his faith in the future of the new corps, for whose existence he was very largely responsible, though, in referring to the early days of the R.F.C. one must always recall the heavy task of organisation so ably carried out by Captain (now Brigadier-General) F. H. Sykes. Since then General Henderson, promoted during the war to Major-General and then to Lieutenant-General, has devoted himself entirely to aeronautical affairs, and has done his best for the Corps.

At first he met with strenuous opposition from Treasury officials, and criticisms from politicians of various parties. Criticisms of R.F.C. administration in the House of Commons in 1913 and 1914 were unskilfully answered by the then Secretary of State for War (and previous Under-Secretary), Lieut.-Col. Seely, and unfortunately gave the impression that the Directorate of Military Aeronautics was hiding its own sins instead of, as later appeared to be the case, the sins of its political chiefs, and information concerning the equipment of the R.F.C. given by Colonel Seely, apparently on the authority of the D.G.M.A., was proved to be inaccurate. The position was undoubtedly difficult, and possibly the political cards might have been better played all round, to the advantage of the R.F.C.

At the outbreak of war General Henderson accompanied our miniature flying corps to France, but after a period handed over the command in the Field to General Trenchard, whose success in that post has been one of the outstanding features of the war. One would, in fact, have expected General Trenchard to have succeeded to the post of Director-General of Military Aeronautics, and the obvious explanation of his not doing so seems to be that no other officer could be expected to exert precisely that same wonderful personal influence over the officers and men of the R.F.C. on active service.

On his return to England General Henderson faced the task of creating an enormous flying corps out of nothing, and in spite of errors in policy before the war. If he was unfortunate in some of his assistants he was equally fortunate in others, as is shown by the brilliant staff now in control of Military Aeronautics, for all those to whom the R.F.C. now owes so much have come to the front under General Henderson's command.

As regards the special work for which General Henderson has been "lent," it is stated in the "Times" that he will devote his attention in future to the Air Board alone. This appears to be an eminently probable suggestion. It is unlikely that General Henderson would, of his own accord, dissociate himself from aeronautics, and it would not be surprising if his special work were concerned with the schemes pertaining to that Imperial Air Service, of which there has been so much talk lately, for it is generally understood that he has always been in favour of a single Air Service, as witness the original R.F.C. with its Naval and Military Wings. In any case, it is well to recognise that no man has worked harder in the cause of military aeronautics, nor has any done his duty, as he saw it, more whole-heartedly. Lieut-General Sir David Henderson, K.C.B., D.S.O., will, at any rate, go down to history as the founder of British Military Aviation.

Our Loss Another's Gain.

The appointment of Major-General W. S. Brancker to a command abroad will be regretted by many who recognise the high value of the work which he has done for the R.F.C. at home, though certainly those who are about to come under his command will profit thereby. General Brancker, as a Captain of Artillery on the staff of Sir Douglas Haig, was the first British officer to fly on duty in India, somewhere in 1911. Since then he has devoted himself entirely to aviation, and British aeronautics as a whole, as well as the R.F.C., owes him a great debt of gratitude.

General Brancker was born in 1877, was gazetted to the Royal Regiment of Artillery in 1896, and served in South Africa. He was promoted to Captain in 1902, and to Major in 1913, in which year he was gazetted to the R.F.C. Reserve, while serving as a G.S.O. on General Henderson's staff at the War Office in the newly established Department of Military Aeronautics. In August, 1914, on the outbreak of war, he was appointed Assistant-Director of Military Aeronautics, in which position he did most valuable work. Later he commanded a Wing in France, and later again he commanded a Brigade.

Last year he became Director of Air Organisation, as a Brigadier-General, and this year he was made Deputy-Director of Military Aeronautics, and was promoted to Major-General. In all these positions he has displayed a thoroughness and energy, with even a touch of ruthlessness, which has won for him a reputation for efficiency which has been justified by results. Those who have served under him admire his personal bravery as much as his purely military qualities He is an inveterate flier, and, though he himself is an occasion given to jesting at his own methods of handling an aeroplane, there are few flying officers who are better cross-country pilots. Wherever his new command may be, he will carry with him the good wishes of the great majority of the Royal Flying Corps.

The Defences of London.

There is one other officer who has of late done well in the King's Service who has to be mentioned here, though strictly speaking his concern with the Directorate of Military Aeronautics is indirect. During the

past week sundry curious paragraphs have appeared giving credit for the defence of London to various people. It has consequently been made known semi-officially that the Defences of London are really under the command of Major-General E. B. Ashmore, C.B., M.V.O. Certain papers have referred to him as Brigadier-General Ashmore, R.F.C., but that is only their way of putting it.

General Ashmore is, in fact, a Gunner Officer first, foremost, and all the time. He is incidentally an aviator of no mean ability. He was born on February 20th, 1872, in London, and after a highly distinguished career in the Royal Regiment of Artillery he attained his Majority on April 19th, 1909. He learned to fly on a Bristol biplane at Brooklands, his certificate being No. 281, dated September 3rd, 1912, so that as an aviator he is closely contemporary with General Salmond. He served as a G.S.O. in the Directorate of Military Aeronautics, doubtless with an eye to the use of aeroplanes as an accessory to artillery rather than as separate entities, and he went to France with the R.F.C. at the outbreak of war.

On November 18th, 1914, he was gazetted temporary Lieut.-Colonel, as a Wing-Commander R.F.C., but when later on he was promoted to Brigadier-General one gathers that it was as an artillery general that he took his step.

Naturally it is not permissible to say when or why he was appointed to command the London Defences, but it is obvious that a gunner officer who regards aeroplanes as a component part of the defence scheme rather than as the be-all and end-all of existence, is likely to achieve excellent all-round results. Probably none realises better than the enemy's raiding pilots the improvements which are constantly being made in our defences, but nevertheless it would be unwise to say very much about them. One can, however, safely say that good as they are at the moment they are far from being in full flower—if one may be permitted a trifle of imagery. They are, so to speak, still in the bud.

And doubtless when the Hun-fly comes trifling round the said bud in his usual self-confident way, he will find that the fire-blossom, to which Mr. Kipling's immortal Mowgli referred as "the red flower," will suddenly burst into full bloom with a splash which will considerably upset the inherent stability of even the most stolid German pilot.

One's confidence in the ability of the London Defences ultimately to deal with raiding aeroplanes as successfully as they have dealt with the Zeppelin menace must be one's excuse for what might otherwise appear to be unseemly levity on a most serious subject.

A Fair Outlook.

On the whole the prospects of Military Aeronautics have never looked so well as they do to-day, and it is earnestly to be hoped that if or when the Imperial Air Service comes into being, its extensive organisation will not be permitted to disorganise in any way the excellent situation in which the R.F.C. now stand. Young, energetic, and yet experienced officers, veterans in aerial warfare, hold all the chief positions in the Corps.



(*Photograph by Swaine*).

Major-General E. B. Ashmore, C.B., M.V.O.

They are in close touch with active service pilots, and with the latest ideas in aeroplane design and armament.

We have always had the best pilots in the world, we have for a long time had the best aeroplane designs in the world, we are rapidly acquiring the best system of aircraft production in the world, and one is fairly sure that we have now the best staff in the world where purely military aeronautics is concerned. Just as the Army in France has, in the Army's own phrase, "its tail well up," so the R.F.C. is feeling quite certain of its moral and mechanical superiority over the enemy. There is still much to be done. There will still be losses to mourn. There will still be mistakes to be criticised and to be put right. But, even as Sir Douglas Haig's men in Flanders, after all their adversities, are now on the top of the ridges, obtaining a Pisgah-sight of the promised land to the North and East, so one may safely say that military aeronautics has crossed the divide, and is on the fair road to becoming the foremost and greatest service of its kind in the world.—C. G. G.

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THE CURTISS CORRUPTION CHARGE.

The October Sessions for the jurisdiction of the Central Criminal Court were opened by the Lord Mayor at the Sessions House, Old Bailey, on October 9th.

On the application of Mr. H. D. Roome, appearing for the prosecution, the hearing of the case of Mr. William Augustus Casson, on bail, who is charged with conspiring to contravene the provisions of the Prevention of Corruption Act in respect to Admiralty contracts relating to aeroplanes, was postponed until the next Sessions.

On More and More and Still More.

On the evening of October 10th the Viscount Cowdray, President of the Air Board, took the chair at a lecture given at the Æolian Hall by the well-known decorator and colourman in words who prefers to be known to the world as "Boyd Cable." In his introductory remarks Lord Cowdray set forth simply and clearly some of the problems which beset him in his official capacity.

Lord Cowdray said that in the last few weeks Mr. "Cable," who had served at the front as an artillery officer, and had done his writing in his scanty leisure, had been visiting some of the chief centres of aircraft production to inform the workers in those centres as to the magnificent work which the aircraft they were manufacturing were achieving in the field.

Mr. "Cable" had been placed temporarily at the disposal of the Air Board for this purpose, and the workers whom he had visited were most enthusiastic as a result. At one factory the workers subscribed quite a handsome amount from their wages for R.F.C. charities.

He himself (Lord Cowdray) was primarily responsible for the production of as many aeroplanes as could be designed and produced of the best possible type. What these should do was for the fighting Services to arrange.

A good many of the problems of aircraft production were not appreciated by some of those true and appreciative friends of the air services who allowed themselves by a few strokes of the pen to create on paper squadrons almost illimitable in number. There were limits to the supply of skilled labour and of raw material, not only for aircraft, but for other instruments of war, and there was a shortage of material not only of local but of world stocks arising from the orgy of destruction in which the world was involved, and from the enormous demands of the mechanical side of warfare.

Increase of production in one direction almost inevitably meant decrease of production in other directions, and war demands had to be considered as a whole. He was thankful to say that the Air Board's demands for men and material were considered to be of vital importance.

The number of aeroplanes and seaplanes had been enormously increased, and must now be considered highly satisfactory. But, like Oliver Twist, the demand was for more and more, and still more, and these demands were being met.

Nothing in the war was more wonderful or more successful than the Air Service. It had become the eyes of the Army, a scout for the Navy, the terror of the submarine, and it would be by no means an inconsiderable factor in determining the final victory which would compel our foes to sue for peace on terms which would secure the right and freedom of mankind for all time.

Some False Premises.

Mr. "Boyd Cable" then delivered his lecture, which was well illustrated by actual photographs taken by the R.F.C. at the front. Considered purely as a lecture it was very good indeed, for Mr. "Cable" has a clear and simple method of expressing himself, and has the gift of interesting his audience. But considered as an exposition of air war the lecture suffered from certain false premises, possibly unavoidable on account of the lecturer's official position, which would necessarily cramp his style if his personal opinions differed from official policy. Nevertheless one recalls a letter of Mr. "Cable's," which appeared many months ago in the public press, in which he advanced much the same opinions as those expressed in his lecture, these opinions being, in effect, that it is much more important for our aircraft to bomb enemy ammunition dumps and railways behind the fighting line than it is to bomb munition factories in Germany or to defend this country against bomb raids. In other words, the old official doctrine of "darkness and composure." I trust that I do not misrepresent Mr. "Cable," but that is distinctly the impression which his lecture last week and his letter of months ago convey to me.

His theory appears to be that by continually blowing up the enemy's dumps and cutting railways the strain on our men in the fighting line is relieved. In support of this argument he showed an excellent photograph of an ammunition train in a siding, well alight as the result of our aviators' bombs, and explained to his audience that this represented so many less rounds of ammunition fired into our lines, and so many lives saved, which is perfectly true, but in the argument lies an excellent example of the false premise when applied to the whole subject.

His theory of bombing reminds one of the excellent Mrs. Partington's efforts to sweep the roused Atlantic out of her house with a mop. The ordinary engineer would naturally proceed to curb the Atlantic with a coffer-dam if he desired to protect a small area, or with a sea wall if concerned with it on a bigger scale.

Official Examples.

Various official photographs have shown the relative inaccuracy of bomb-dropping as compared with gun-fire. Mr. "Cable" himself exhibited, with the just pride of a gunner officer, photographs illustrating the deadly accuracy of long-range gun-fire directed by aircraft. Sundry of my readers who were on the Somme will recall the astonishing shooting of a certain gun manned by the Royal Marine Artillery, which dealt faithfully with German positions round Bapaume at such ranges that the artillery observation machines of the period actually had to fly back towards their own lines to get within wireless touch of the gun to signal the corrections.

On the other hand, officially published photographs of bombed enemy aerodromes show the way in which bombs are sprinkled all over the place without doing damage. And I fancy that most artillery officers and R.F.C. artillery observation officers will agree that up to the extreme limit of range of big guns there is no comparison between the accuracy of shells and bombs.

Therefore, it seems obvious that better execution can be done on enemy dumps and railways in "Hunland"—which, as I mentioned in the last issue, is Allied territory occupied by the enemy—with long-range guns than with aeroplane bombs. In other words, a coffer-dam, or barrage, can be built up by artillery fire, for something very close on 20 miles behind the enemy's lines, which will block all his roads and railways, and do far more to hinder the flow of his ammunition to the firing line than can ever be done by trying to mop up the flow with aeroplane bombs.

This is an old, old theory, discussed long months ago in this paper, and supported by gunners and aviators alike, but it is worth restating now because our preponderance of artillery over that of the enemy makes such a long-range barrage more practicable, and because our increasing output of aircraft is making it possible "at the proper moment" to put up a more distant line of offensive-defence, which—to carry on

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the original metaphor—one may describe as the sea-wall. The fact that the proper moment is reasonably close makes it the more important that none of Lord Cowdray's more and more, and still more aeroplanes should be wasted in the mopping process.

Mr. "Cable" showed his admiring, if innocent, audience a pretty picture of a machine starting on a night bombing raid. One cannot for obvious reasons describe the machine, but to anyone who was able to envisage the lay-out or general design of a real night-bomber the picture would have been comic if it had not been for the underlying tragedy. But possibly this Heath-Robinsonian effort was shown on purpose, for the delectation of possible enemies among the audience, and one can only hope that the type is no longer in use.

The Weakness of Limited Vision.

Where Mr. "Cable's" theories or opinions fail is in that they do not consider the effect of neglecting to carry out bomb raids into Germany in the past as they should have been carried on, and that they do not consider the effect of omitting to defend the Metropolitan area, which we were assured in an official speech last week is the biggest munition producing area in this country.

Mr. "Cable's" vision of bomb raids seems to be limited to those made into "Hunland." He apparently is of the opinion that a bomb dropped on an ammunition train is of prime importance, and fails to see that the same bomb dropped in a munition factory in Germany would prevent the loading of many such trains. It is well to realise this fact clearly, as well as the corollary that all the bombs which missed that train fell among seasoned troops on whom they had little effect, whereas those which would have missed the factory would have fallen in the surrounding district, and would have had salutary effect on the workers belonging to that factory.

In the same way, if an ammunition dump is blown up another one is built up in a comparatively short time, whereas a thoroughly bombed factory is out of action for months, and its whole output for that period is destroyed (because it is not produced), and thus more lives are saved in the firing line than would be saved by blowing up dozens of trains.

Home Defence.

For precisely the same reason home defence is of prime importance. As Sir George Cave pointed out, every raid on this country means so many thousands of working hours lost. If one aeroplane shop of 400 men is shut down for ten hours—that is to say, for a whole night-shift—one may reckon roughly that one aeroplane less has been produced. The shop may be employed wholly on spares, or component parts, but anyhow 4,000 man-hours is about the equivalent of one ordinary aeroplane, so that means one less of the more and more, and still more machines which the Air Board is working so strenuously to produce.

Consequently, it is of vital importance that the work should not be interrupted, and if we omitted to defend this country we should be playing directly into the hands of the enemy. For which reason it is actually much more important that the defence should take place on the other side of the Channel than on this.

No matter how good our defences may be on this side, they cannot prevent a certain stoppage of work whenever a raid warning is given, and it is necessary to give a warning whether one enemy aeroplane or a hundred reach our coasts. Therefore, it is the more important to prevent them from starting from Belgium or Germany, as the case may be.

Mr. "Cable" will surely agree that the absence of one aeroplane from a reconnaisance squadron—owing to stoppage of work caused by an air raid warning—is likely to cost our men in the front line as many lives as would the presence of all the ammunition in that train, the destruction of which he exhibited with such gusto. Therefore, he may agree that it is at least as important for our bombing machines to attack enemy aerodromes in Belgium—as part of the defence of London—as it is to bomb dumps and railway lines in "Hunland," especially when his gallant corps, the Royal Regiment of Artillery, can do the job of smashing railways more cheaply and more accurately than can aeroplanes.

He made great play with the fact that for every pound of bombs dropped on our side of the lines—including London presumably—our aviators have dropped a ton of bombs in "Hunland." I therefore commend to his consideration the relative effect of one pound of bomb—plus an air raid warning—in any industrial centre, whether here or in Germany, as against the effect of one ton of bombs dropped among seasoned troops in the field.

A couple of aeroplanes merely flying over a dozen German manufacturing towns every night would deplete the supply of ammunition in the firing line more than fifty aeroplanes dropping bombs in the dark on the supposed positions of ammunition dumps.

Overdoing It.

One felt, incidentally, at the lecture that in his earnest endeavour to create interest in and sympathy for our aviators, Mr. "Cable" rather overstated the danger of flying, and such overstatement of danger is liable to have a deleterious effect on recruiting for the R.F.C. He laid much emphasis on the fact that, apart from air fighting, every aviator takes his life in his hand whenever he goes aloft, and illustrated his statement with an excellent picture of an R.E.8 in a not unusual position, flat on its back after performing its favourite trick of falling over its own nose. The illustration was unfortunate, in that it indicated rather the habits of a species than the characteristics of a race.

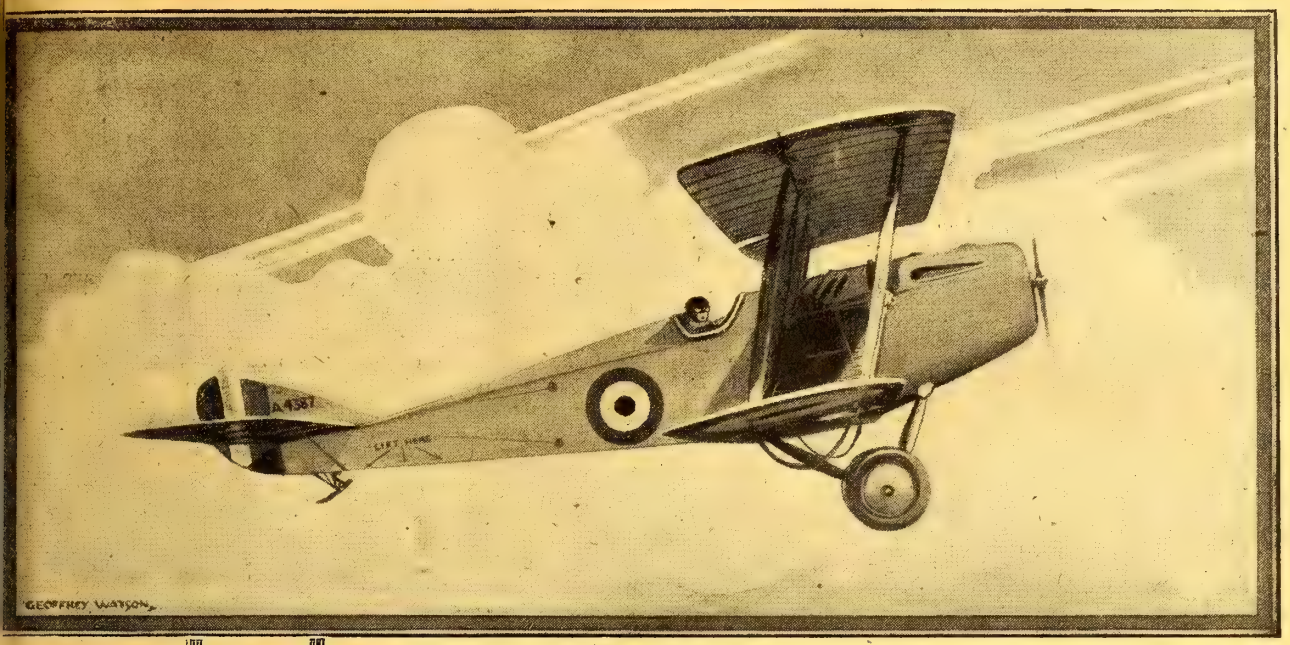
None realises better than I do the dangers of flying, but when one knows something of the immense mileage flown by enthusiastic novices and reckless learners without a fatal accident one begins rather to believe in the inherent safety of ordinary flying. And even the grim casualty lists of the R.F.C. on active service compare very favourably with those of any battalion of the P.B.I.—as the Army calls its "poor blooming infantry"—when it goes over the top of its trenches.

Also, the aviator who survives returns to a decent dinner and a decent bed at the end of his day's work, and does not have to sleep on a ledge in a wet trench in imminent danger of falling in and being drowned if he turns over in his sleep.

The Better Whole.

Mr. "Cable," as I have said, is excellent in parts, but he could do better as a whole. I feel sure he could do much more to enthuse aircraft workers, and thus to assist Lord Cowdray in producing more and more aeroplanes, if he would endeavour to widen his vision and impress on his workshop audiences how very much more they will be doing to end the war when the machines on which they are working are destined to worry the German people as they themselves have been worried.

Consider for a moment the feelings of the workers themselves. One lot are working on school machines, very necessary work, but not inspiring when one considers that one's work for a month may be abolished in an instant through some silly kid losing his head







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when learning, or acting the goat when showing off before his friends.

Another lot may be on artillery observation machines. A much more inspiring task. The idea that this machine on which one is working may guide a big gun to blow up a Hun general, complete with staff as fitted, is enough to make one enthusiastic.

But consider a shop at work entirely on aeroplanes or engines for the bombing fleet. Every piece of work one does is destined to go direct to Germany and "Give 'em Hell"—in the words which our pious Premier says he did not say. One can imagine the workpeople inscribing on their work such legends as "A message to the Kaiser, from Bill Smith," or "Here's one for Hindenbeggar from 'Liza Jones." A little skilful talking, either by the manager or by Mr. "Cable" would raise such enthusiasm as would multiply the output of that shop many times over.

I submit, therefore, that as we want more and more aeroplanes, the advocacy of raids on Germany, rather than their depreciation in favour of minor operations, is the better way to help their production, especially as public feeling and official policy for once agree on a matter of national importance.

Meantime, I commend to Mr. "Cable" a short course of study in the science of real bomb-dropping, for the "Christmas Tree" kind of bombing machine with which he appears to be familiar is as different from the real bomb-dropper as are the "Ladysmith" 4.7's and their haphazard methods in the early fighting in Flanders from the modern long-range guns plus modern artillery observation. A little modernising of his lectures in this respect would make them of even greater value than they are as an educative influence, and he certainly deserves great credit for the good work which he has done already.

The Greater Problems.

All this, however, is really by the way, so far as the problems to which Lord Cowdray referred are concerned, though the system of inspiring the workers to further efforts by means of lectures is thoroughly sound. The limits of space available, owing to the sudden announcement of the changes in the Directorate of Military Aeronautics, prevent me from referring to such subjects as the supply of labour and of raw material.

There is also the matter of the abolition of "leaving certificates" for workmen, which, in the views of some manufacturers, will seriously impede our output. I commend to all those interested in the subject, the study of a letter from "A Labour Correspondent" which appeared in the "Morning Post" of October 12th. Apparently men as well as employers are dissatisfied.

There is also the question of how best to deal with small workshops and "one-man businesses," which in the aggregate represent an enormous output. On this subject I have lately received a number of letters. All these are matters for future discussion.—C. G. G.

THE AERONAUTICAL WAR EXHIBITION.

The exhibition of war photographs and trophies, in aid of the Flying Services' Hospitals and Viscount French's War Charities, which has toured the principal towns in the provinces so successfully, will come to an end with an exhibition at the People's Palace, Mile End Road, where the exhibition will be opened on November 1st.

The exhibition was on view at the Grosvenor Galleries, New Bond Street, in the first instance, where it was visited by many distinguished people.

Thereafter the following towns and cities were visited:—

Birmingham, opened by Lieut.-General Sir David Henderson, K.C.B., D.S.O.

Coventry, opened by Sir Arthur Du Cros, Bart.

Liverpool, opened by The Earl of Derby.

Manchester, opened by Commodore Godfrey Paine, C.B., R.N.

Glasgow, opened by The Duke of Atholl, Mr. Lloyd George, and Viscount French.

Edinburgh, opened by Sir David and Lady Beatty.

Dundee, opened by Commodore Godfrey Paine, C.B., R.N.

Sheffield, opened by Lord Montagu of Beaulieu.

Leeds, opened by Mr. Asquith.

The notability who is to open the East End show has not yet been definitely fixed.

During the course of the tour 300,000 people have visited the show, and, exclusive of London, £4,000 has been raised for the Funds; the charge for admission having varied between 3d., 6d., and 1s., and in the Provinces the lower rates were usually charged.

[One hopes that all readers of this paper, who are able to visit the exhibition at the People's Palace, will make a point of doing so, as it is one of the most highly-interesting and educative shows imaginable.—C. G. G.]

LORD DERBY AND AIR WAR.

The Earl of Derby was present on Oct. 13th at a complimentary dinner and presentation given at the Exchange Hotel, Liverpool, by the National Union of Dock Labourers and Riverside Workers to one of their members, Private Ratcliffe, of the South Lancashire Regt., who won the Victoria Cross in the Messines Ridge fighting.

In the course of a speech, Lord Derby said that this country had, with the aeroplane menace, been brought within the war zone, and they must show the same courage at home as their soldiers did at the front. In London a considerable number of men and women were taking refuge in tubes on the slightest provocation, but among many of them it was difficult to understand the language they talked. (Laughter.) The great bulk of the community was not likely to be rattled by air raids, but he hoped they would never forget them. He recommended that this remembrance should be kept alive, as similar raids were remembered in Venice, by the erection of some memorial stone recording the locality of raids and the murders of women and children killed and inscribed with Kipling's words: "Lest we forget."

They must distinguish between the types of air raids—those on military objects, such as ours had hitherto been confined to, and those of Germans on undefended towns, involving the murder of innocent women and children. The former were perfectly legitimate, and no reprisals were asked for, because we had done the same thing ten times more effectively than the Germans, but their kind of bombing, what he would call the political bombing was designed to demoralise our civilian population, which he did not believe would ever be successful.

Our authorities had now promised reprisals, and all he asked was that the public would leave the matter in their hands. It would be effectively done at the right time and in the right way. The only way to stop these raids was to drive the Germans out of Belgium, and then to give them something to think of in their own country. (Cheers.)

Fighting in the air was going to be something to end the war, and nothing in the way of political bombing should be allowed to take the place of the great military air offensive which was to contribute to that object. The Air Board and Ministry of Munitions were fully alive to the fullest necessities of both defence and offence in the matter of aerial activity. All the men and all the machines required would be forthcoming. Great sacrifices had already been made, and while he fully agreed with reprisals for what had been done in this country, their surest and best remedy would be to give Sir Douglas Haig all the help he needed to drive the Germans back to their own country.

[With which, of course, everyone will agree. It is only in conception of methods that one differs from Lord Derby, on the grounds that one bomb in a factory district in Germany is worth 20 on trains and railways in France or Belgium, as a means of decreasing the amount of munitions available in the firing line. —Ed.]

THE GERMAN TRIPLANES.

The recent newspaper reference to the existence of a German triplane is confirmed by the experience of British Flying Officers at the Front. The machine in question seems to be a single-seater tractor-scout with excellent climb and speed, which is judged by some to be better than that of our machines at the time. Observers say that the chords of the wings are progressively narrower from top to bottom, and that the bottom plane is so easily hidden against the remainder of the machine when viewed from certain aspects that it does not always resemble a triplane in the least. One also hears of one or two narrow escapes on the part of British aviators from these German triplanes through mistaking them for their own, and it should no longer be taken for granted that a three-decker machine is necessarily of British origin.





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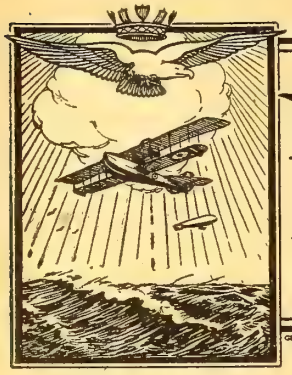
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FROM THE "LONDON GAZETTE."

Admiralty, Oct. 3rd.

Oct. 5th.—Temp. Flt. Sub-Lt. to be temp. Flt. Lt. :—B. H. Sisson, Oct. 4th.

Oct. 6th.—R.N.A.S.—To be temp. Sqdn. Comdr. :—Lt.-Comdr. Warwick Wright, R.N.V.R., Oct. 6th.

War Office, Oct. 9th.

REGULAR FORCES.—The following Wt. Officer to be Sec. Lt. for service in the Field :—

R.F.C.—Mil. Wing.—Actg. Sjt.-Maj. A. M. Cawthra, Sept. 14th.

Establishments.—R.F.C.—Mil. Wing.—Wing Comdr.—Maj. R. G. Cherry, M.C., R.A., from a Sqdn. Comdr., and to be temp. Lt.-Col. whilst so empld., Aug. 28th.

Sqdn. Comdrs.—From Flt. Comdrs., and to be temp. Majs. whilst so empld., Sept. 21st :— Lt. (temp. Capt.) K. D. R. Murray, Spec. Res. ; Lt. (temp. Capt.) T. Maxwell-Scott, M.C., Spec. Res.

Adjt.—Lt. F. A. Stacpole, E. York. R., Spec. Res., and to be temp. Capt. (without the pay or allowances of that rank) whilst so empld., Sept. 17th.

Special Appt.—(Graded as a Park Comdr.).—Temp. Maj. E. A. Goodwin, Gen. List, from a Park Comdr., Sept. 22nd.

Equipment Officers, 2nd Cl.—From the 3rd Cl.—Sec. Lt. (temp. Lt.) C. A. Hudson, R.F.C., T.F., and to be temp. Capt. whilst specially empld., Aug. 8th, 1917.

War Office, Oct. 10th.

REGULAR FORCES.—Staff.—The following temp. appt. is made at the War Office :—

Dep. Asst. Dir.—Capt. (temp. Maj.) S. A. Currin, R.F.C., Spec. Res., from a Special Appt. (graded as a Park Comdr.), and to relinquish his temp. rank, July 10th.

The date of the appt. of Lt.-Col. R. J. B. Mair, R.E., as an Asst. Dir., is July 27th, and not as in the "Gazette" of Aug. 14th.

Establishments.—R.F.C.—Mil. Wing.—Flt. Comdrs.—From Flying Officers.—Capt. W. S. Scott, M.C., Lan. Fus., T.F., Sept. 7th. And to be temp. Capts. whilst so empld. :—Temp. Sec. Lt. (temp. Lt.) G. R. A. Deacon, Gen. List; Sec. Lt. A. G. V. Taylor, Ind. Inf., Sept. 26th.

Park Comdr.—Temp. Qrmr. and Hon. Lt. (temp. Capt.) S. C. Parr, R.F.C., from an Equipment Officer, 1st Cl., and to be temp. Maj. whilst so empld., Sept. 1st.

Equipment Officers, 1st Cl.—Capt. Sir J. W. B. Simeon, Bt., Hamps. R., T.F., from an Equipment Officer, 3rd Cl., Sept. 1st. Sec. Lt. (temp. Lt.) O. Lindquist, Spec. Res., from an Equipment Officer, 2nd Cl., and to be temp. Capt. whilst so empld., Oct. 2nd.

Schools of Instruction.—Schools of Mil. Aeronautics.—Instrs.—(Graded as Equipment Officers, 1st Cl.).—Lt. (temp. Capt.) G. I. N. Deane, R.E., T.F., an Equipment Officer, 1st Cl. ; temp. Lt. A. Latimer, Gen. List, an Equipment Officer, 2nd Cl., and to be temp. Capt. whilst so empld., Aug. 17th.

Memoranda.—Sept. 19th, 1917: Cecil Stanley Southwell, Francis Gordon, Charles Henry Housden, Stanley Arthur Piper, Richard Edward Cragg to be temp. Hon. Lts. whilst employed as Asst. Insprs., Aeronautical Inspn. Dept.

War Office, Oct. 11th.

REGULAR FORCES.—General Staff.—G.S.O., 3rd Grade.—Lt. (temp. Capt.) C. E. Wardle, R.F.C., Spec. Res., from a Flt. Comdr., and to retain his temp. rank whilst so empld., Aug. 5th.

Establishments.—R.F.C.—Mil. Wing.—Flt. Comdrs.—From Flying Officers, and to be temp. Capts. whilst so empld. :—Lt. J. L. Williams, Spec. Res. ; temp. Lt. F. B. Sedgwick, Gen. List, Sept. 1st.

Adjt.—Lt. N. A. Daniell, C. Gds., to be temp. Capt. (without the pay or allowances of that rank) whilst so empld., and to be secd., Sept. 18th.

The King has been pleased to approve of the award of the Military Cross to

Lt. William Wallace Cook, N.Z. Forces and R.F.C.

For conspicuous gallantry and skill in an attack on a Zeppelin. He ascended from his station during a strong wind thick mist, and low clouds and showed great determination eventually giving up the attack when 60 miles out to sea.

His return journey was hazardous, but with great skill he eventually effected a landing in a field within a quarter of a mile of the coast, having been in the air for 5½ hours.

War Office, Oct. 12th.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing—Adjts.—Lt. (temp. Capt.) T. M. Eggar, Lond. R., T.F., vice temp. Sec. Lt. A. E. Morgan, S. Wales Bord., who relinquishes actg. rank of Capt., Sept. 6th. Capt. L. M. P. Sulivan, Lond R., T.F., Sept. 4th.

Schools of Instn.—Schools of Mil. Aeronautics.—Asst Comdt.—(Graded as a Sqdn. Comdr.).—Capt. G. G. Adeley, R Ir. Rif., a Flying Officer, and to be temp. Maj. whilst so empld. vice Maj. P. E. L. Elgee, R. Perks. R., Sept. 18th.

Chief Instr.—(Graded as a Sqdn. Comdr.).—Sec. Lt. (temp Capt.) W. C. Campbell, D.S.O., M.C., Spec. Res., from an Instr (graded as a Flt. Comdr.), School of Mil. Aeronautics, and to be temp. Maj. whilst so empld., vice Lt. (temp. Maj.) G. S. M Ashby, R.A., Sept. 18th.

Instr.—(Graded as a Flt. Comdr.)—Capt. C. O. Fairbairn N. Lanc. R., Spec. Res., a Flt. Comdr., vice Sec. Lt. (temp Maj.) W. C. Campbell, D.S.O., M.C., Spec. Res., Sept 18th

School of Technical Training.—Gen. List.—The undermentioned Equipment Officers, 2nd Cl., to be temp. Capts. (without the pay or allowances of that rank) whilst specially empld. Temp. Lt. C. H. Simpson, Gen. List, 2nd July, 1917. Temp Lt. P. Ellis, Gen. List, 4th July, 1917. 16th July, 1917 : Temp Lt. C. M. Seth Ward, Gen. List ; temp. Lt. C. S. Willmott, Gen List. Temp. Lt. J. M. Bell, Gen. List, 18th July, 1917. Temp Lt. W. J. King, Gen. List, 28th July, 1917. Sec. Lt. (temp Lt.) F. N. D. Masters, R.F.A., T.F., 1st Aug., 1917. Temp Lt. H. N. Sandys, Gen. List, 4th Aug., 1917. Temp Lt. R. C Cox, Gen. List, 16th Aug. 1917.

The undermentioned, from R.F.C., to be temp. Sec. Lts. 24th Sept., 1917 : Serjt. Frank Leslie Barnett, 2nd Cl. Air Mech. Harry Boswell Norris, Actg. Corpl. Sydney George Newport, Actg Corpl. Hyman Cohen, Flt. Serjt. George William Cox, Flt. Serjt Herbert Sidney Coxford Cann, Flt. Serjt. George Barnes, Corpl Harry Alexander Dinnage, Corpl. Alec. Broadley, Corpl. Harry Moon, Serjt. Richard Alfred Munday, Corpl. Harold Robert Corby Van de Velde, Actg. Corpl. Gerald Ashby Wodehouse Garland, 1st Cl. Air Mech. Richard Henry Thomas, Actg. Corpl. George Louis Gordon Watson, Corpl. David Horace Fenner. Flt. Serjt. Ernest Taylor, Serjt. Maurice Leonard Metcalfe, Corpl. William Joseph Richards, Corpl. William Edward Lowrie. Corpl. James Harold Hunter, Serjt. Walter Massey, Serjt. Henry George Watts Lock, Serjt. Reginald Lord Heyworth Hulme, Serjt. Sydney William Smith.

The undermentioned 1st Cl. Air Mechs., from R.F.C., to be temp. Sec. Lts. 24th Sept. 1917 : Claude Francis Lane, John William Power, John Thomas Baugh, Frederick Stanley Mockford, Cecil Thomas Christie, Sidney Charles Bown.

Memorandum.—Maj. the Hon. C. M. P. Brabazon, I. Gds., to be temp. Lt.-Col. whilst empld. as a Wing Comdr., R.N.A.S., 30th June, 1917.

War Office, Oct. 13th.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing.—Sqdn. Comdr.—Capt. (temp. Maj.) J. V. Steel, R.A., from an Instr. (graded as a Sqdn. Comdr.), School of Inst., and from a Flt. Comdr., and to retain his temp. rank whilst so empld., Sept. 19th.

Flt. Comdrs.—From Flying Officers.—Temp. Capt. R. D. Simpson, Gen. List, Sept. 25th : Lt. R. I. Van der Byl, Canadian Gen. List, and to be temp. Capt. whilst so empld., Sept. 26th.

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SPECIAL RESERVE OF OFFICERS.—Supplementary to Regular Corps.—R.F.C.—Mil. Wing.—Lts. to be Capts.:—(Temp. Maj.) C. P. Ogden, (Temp. Maj.) L. M. Bennett, (Temp. Maj.) S. H. B. Harris, (Temp. Maj.) G. L. P. Henderson, M.C., (Temp. Maj.) H. L. Cooper, (Temp. Maj.) M. E. Lane, (Temp. Maj.) C. Barber, (Temp. Capt.) R. H. Mayo, (Temp. Capt.) C. H. Pixton, (Temp. Maj.) L. W. Learmount, D.S.O., M.C., (Temp. Maj.) H. A. Oxenham, (Temp. Maj.) G. D. Hannay, (Temp. Maj.) H. MacD. O'Malley, (Temp. Maj.) J. P. C. Cooper, M.C., (Temp. Maj.) F. S. Creswell, (Temp. Maj.) F. A. G. Noel, (Temp. Capt.) J. W. Woodhouse, D.S.O., M.C., (Temp. Capt.) G. D. Pidgeon, (Temp. Maj.) B. C. McEwen, M.C., (Temp. Maj.) L. W. F. Turner, (Temp. Maj.) C. Hirtzel, (Temp. Maj.) G. E. W. Humphery, (Temp. Maj) G. S. Peacock, (Temp. Maj.) F. F. Minchin, M.C., (Temp. Maj.) A. T. Whitelock, (Temp. Maj.) K. K. Horn, (Temp. Maj.) J. H. Herring, D.S.O., M.C., (Temp. Maj.) R. F. S. Morton, (Temp. Maj.) V. D. Bell, (Temp Maj.) J. P. C. Sewell, (Temp. Maj.) C. C. Miles, M.C., (Temp. Maj.) H. Lee, (Temp. Maj.) G. L. Main, (Temp. Maj.) C. G. Smith, (Temp. Maj.) A. T. Watson, (Temp. Maj.) S. S. Kennedy, (Temp. Maj.) A. K. Tylee, (Temp. Maj.) J. W. Jardine, (Temp Maj.) C. R. Huggins, (Temp. Capt.) M. O. Darby, Sept. 1st (Temp. Maj.) G. I. Taylor, (Temp. Maj.) T. G. Clarson, Sept. 2nd. (Temp. Maj.) H. G. Gold, Sept. 4th.

War Office, Oct. 15th.

REGULAR FORCES.—Staff.—Following temp. appts. are made at the War Office:—Asst. Dir.—Maj. J. H. A. Landon, D.S.O., Essex R., T.F., from a Sqdn. Comdr., R.F.C., and to be temp. Lt.-Col. whilst so empld., vice Maj. W. D. Beatty, R.E., Aug. 13th.

Establishments.—R.F.C.—Mil. Wing.—Flt. Comdrs.—From Flying Officers, and to be temp. Capts. whilst so empld.:—Lt. F. J. Miller, Spec. Rec., Sept. 7th. Temp. Lt. H. G. E. Luchford, Gen. List, Sept. 11th.

Schools of Instn.—Schools of Mil. Aeronautics.—Instr.—Graded as a Flt. Comdr.—Temp. Sec. Lt. C. G. Durham, Gen. List, a Flying Officer (Observer), and to be temp. Capt. whilst so empld., Sept. 26th.

Asst. Instrs.—Graded as a Flying Officer.—Lt. C. L. Willcox, Spec. Res., a Flying Officer, Oct. 1st, 1917. Graded as an Equipment Officer, 2nd Cl.—Temp. Sec. Lt. A. L. Hyslop, Gen. List, an Equipment Officer, 3rd Cl., and to be temp. Lt. whilst so empld., Sept. 26th, 1917.

Equipment Officers' School of Instn.—Chief Instr.—Graded as a Park Comdr.—Sec. Lt. (temp. Capt.) G. J. Read, N. Staffs R., Spec. Res., from an Instr. (graded as an Equipment Officer, 1st Cl.), School of Mil. Aeronautics, and to be temp. Maj. whilst so empld., Aug. 17th.

Instr.—Graded as an Equipment Officer, 1st Cl.—Sec. Lt. (temp. Lt.) W. F. Bryant, R. W. Surr. R., an Equipment Officer, 2nd Cl., and to be temp. Capt. whilst so empld., Aug. 17th.

Asst. Instrs. (graded as Equipment Officers, 2nd Cl.). Aug. 17th, 1917: Temp. Qrmr. and Hon. Lt. (temp. Lt.) H. C. Gaze, R. Fus., from an Asst. Instr. (graded as an Equipment Officer, 2nd Cl.), School of Mil. Aeronautics, and to retain his temp. rank whilst so empld. Temp. Lt. D. O'B. Gill, R.E., an equipment Officer, 3rd Cl. And to be temp. Lts. whilst so empld.—Sec. Lt. W. Thorne, an Equipment Officer, 3rd Cl.; temp. Sec. Lt. (on prob.) D. R. M. Wright, Gen. List, and to be confirmed in his rank.

Examining Officer.—Graded as an Equipment Officer, 1st Cl.—Temp. Lt. J. A. Payne, Gen. List, from an Asst. Instr. (graded as an Equipment Officer, 2nd Cl.), School of Mil. Aeronautics, and to be temp. Capt. whilst so empld., Aug. 17th.

NAVAL.

The following appointments have been made in the Royal Naval Air Service:—

Oct. 12th.—Flt. Sub-Lts.—H. Gartside-Tippinge and E. L. D. Bartley, both promoted to rank of Flt. Lt., seny. Sept. 15th.

Lt., temp. (R.N.V.R.).—W. L. Marsh, promoted to Lt. Comdr., temp. (R.N.V.R.), seny. Oct. 10th.

Proby. Sqdn. Comdr.—A. Leamon-Berry, confirmed in rank of Sqdn. Comdr., seny. Sept. 21st.

Proby. Flt. Lt., temp. G. D. Nelson confirmed in rank of Flt. Lt. (temp.), seny. Sept. 21st.

Late Lt., temp. (R.N.V.R.).—C. W. Small, granted temp. commission as Lt. (R.N.V.R.), seny. Oct. 11th.

Mr. S. J. Hern granted temp. commission as Lt. (R.N.V.R.), seny. Oct. 8th.

Leading Mechs., R.N.A.S., A. C. Tapser, and F. G. Tryhorn granted temp. commissions as Sub-Lt., R.N.V.R., with seny. Oct. 11th.

Oct. 13th.—Mr. F. M. Hannay, entered as Lt. (Temp.), R.N.V.R., seny. Oct. 12th.

Admiralty Communiqués.

Oct. 11th.—In the last 24 hours, 9th-10th October, patrols were carried out by the Royal Naval Air Service during which enemy trenches were attacked by machine-gun fire.

One pilot, on being heavily shelled by anti-aircraft guns, descended and attacked the guns' crews, scattering them and silencing the guns.

Early yesterday morning (October 10th) bombing raids were made on the following military objectives:—Thourout railway junction and trains; Lichtervelde railway junction and trains.

Large quantities of explosives were dropped.

All machines returned safely.

Oct. 12th.—Yesterday afternoon, in spite of heavy clouds and rain, naval aircraft carried out a bombing raid on Sparappelhoek aerodrome. Many bombs were dropped.

All machines returned safely.

Oct. 14th.—On the 13th, owing to unfavourable weather, operations by naval aircraft were restricted.

One of our fighter patrols, however, during the forenoon shot down an enemy machine over Ostend, which was observed going down in flames.

The Casualty List.

Reported Oct. 10th.

Missing.—Watson, Flt. Sub-Lt. M. J., R.N.

Injured.—Edwards, Flt. Lt. Ll., R.N.
Howell, Mr. H., Bsn., R.N.

Previously reported Missing, now presumed Killed.—Bowman, Flt. Sub-Lt. G. G., R.N.

Reported Oct. 11th.

Previously reported Missing, now presumed Killed.—Smith, Flt. Sub-Lt. Langley F. W., D.S.C., R.N.

Reported Oct. 12th.

Accidentally Injured.—Keith, Flt. Lt. C. H., R.N.
Snow, Sub-Lt. A. C., R.N.V.R.

Previously reported Missing, now reported Prisoners.—Desbarats, Flt. Sub-Lt. E. W., R.N.
Wilford, Flt. Sub-Lt. J. R., R.N.

Reported Oct. 13th.

Accidentally Killed.—Wood, Flt. Lt. M. C., R.N.

Previously reported Missing, now reported Prisoners.—Foster, Flt. Sub-Lt. W. E., R.N.
Burns, Obsr. Sub-Lt. H., R.N.

Reported Oct. 16th.

Accidentally Killed.—Horswell, Flt. Sub-Lt. B. W., R.N.

Wounded.—Sneath, Flt. Sub-Lt. W. H., R.N.

Accidentally Injured.—Wood, Flt. Lt. P., R.N.
Swann, Prob. Flt. Officer, L. E., R.N.

Missing.—Clemson, Flt. Comdr. A. W., D.S.C., R.N.
Black, Flt. Sub-Lt. N., R.N.

Previously reported Missing, now presumed Killed.—Strathy, Flt. Sub-Lt. F. S., R.N.
Baron, Flt. Sub-Lt. M. N., R.N.

PERSONAL NOTICES.

Deaths.

HORSWELL.—Flt. Lt. Basil W. Horswell, R.N., was accidentally killed while flying a seaplane on Oct. 11th.

KENDALL.—Flt. Sub-Lt. E. H. Kendall, R.N., reported as "presumed killed," was the younger son of Mr. and Mrs. E. C. Kendall, of Heswall, Cheshire. He was educated at Mr. Foster's, Stubbington, and Shrewsbury, School, where he won the school quarter-mile swimming race. He went to Salonika with the 2nd Duke of Cornwall's L.I. as lieutenant, was invalided home, and then joined the R.N.A.S., and had only been eight days at the front when, flying at a height of 13,000 ft., he was attacked by an enemy machine, had his petrol tank fired, and was killed.

Engagement.

YOUNG—GROSE.—The marriage will take place, at Elm Road Church, on October 27th, at 9 a.m., between Lieut. T. Kenneth Young, R.N.V.R., attd. R.N.A.S., elder son of Mr. and Mrs. Thomas F. Young, Ingress, Furze Lane, Purley, and Helen Dorothy, youngest daughter of Mr. and Mrs. Grose, Tintagel, Beckenham.

Births.

LLOYD.—On Oct. 10th, 1917, at 34, Albert Road, Regent's Park, N.W., Linda, wife of Flt. Lt. Wilfred Lloyd, R.N., of a son.

WOOLNER.—On Oct. 12th, at 38, Nevern Square, S.W., the wife of Flt. Lt. J. H. Woolner, R.N. (née Lucy Polgreen), of a son.

Flt. Sub-Lt. Norman Black, R.N., who is officially reported missing, left Christ's Hospital in July, 1916, when he was Senior Grecian and captain of the school. He was prominent in sport as well as in scholarship, and was the school's captain of cricket. He is now in his 20th year.

MILITARY.

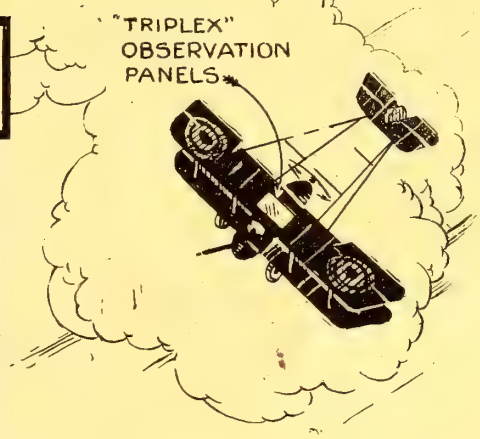
G.H.Q. Communiqués.

Oct. 9th, 10.59 p.m.—The weather was even more unfavourable for flying on the 8th inst. than on previous days. Much work



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was, however, done in aerial reconnaissance, and some artillery work was successfully carried out.

Two enemy machines were driven down out of control; ground targets were also attacked with machine-gun fire.

Two of our aeroplanes are missing.

Oct. 10th, 9.42 p.m.—On the 9th inst. little flying took place except on the battle front, where a great deal of work was done, in spite of a strong gale and thick clouds. The enemy's new gun positions and other suitable targets were reported by our aeroplanes to our artillery, which then dealt with them. Touch was kept with our infantry all day, and the enemy's troops were harassed by machine-gun fire at every opportunity.

A ton of bombs were dropped on Staden during the day, and at night two tons were dropped on Roulers, Courtrai, Menin, and Ledgehem stations (north-east and east of Ypres). A direct hit was obtained on a hostile train, causing a number of explosions.

In air fighting, four German machines were brought down and two others were driven down out of control.

Two of our machines are missing.

Oct. 11th, 9.30 p.m.—On the 11th (?10th) inst., stormy weather continued, and flying was only possible in the early morning and in the evening. These opportunities were taken by our machines to carry on artillery and photographic work, and a number of bombs were dropped by us on hostile billets and hutments and upon a German big gun position.

In air fighting three enemy machines were brought down and two were driven down out of control

Four of our machines are missing.

Oct. 12th, 9.58 p.m.—On the 11th inst. every opportunity was taken by our aeroplanes to reconnoitre the enemy's positions and to carry on artillery and photographic work during the intervals of clear weather.

A large number of bombs were dropped by our machines on hostile billets, and machine-gun fire was opened from low altitudes upon the German infantry in their trenches.

One hostile machine was brought down yesterday in combat and another was shot down by our infantry. Two other enemy machines were driven down out of control.

Five of our aeroplanes are missing.

Oct. 13th, 9.28 p.m.—On the 12th instant the weather could not have been less favourable for the co-operation of our aeroplanes with our infantry in their attack. None the less, machines went out till 4 p.m., both in the rain and during fine intervals, and with great difficulty succeeded in locating the position of our troops. The movements of the enemy were watched, and a great many hostile batteries were located and reported to our artillery.

In addition to this work, over 10,000 rounds were fired by our aeroplanes from machine-guns at hostile infantry in trenches and shell-holes and on the roads. Parties of mounted troops and convoys of hostile transport were also engaged from low altitudes, causing many casualties and great confusion.

Only a few German machines were encountered, presumably on account of the bad weather, and little fighting took place in the air. Four enemy aeroplanes were brought down, and five others were driven down out of control.

Ten of our aeroplanes are missing The very strong west wind, and the suddenness with which storms of driving rain came up, accounted for the non-return of many of our machines. Several of those missing belonged to patrols which were not engaged in fighting, and evidently were lost in the storms.

Oct. 14th, 9.25 p.m.—Owing to the weather, very little flying was done on the 13th inst. In the fine intervals a certain amount of artillery and photographic work was accomplished, and the enemy's new positions were reconnoitred

One of our patrols encountered an enemy formation of double the number of machines, and a determined fight took place, from which four of our aeroplanes failed to return. Owing to the close nature of the fighting the number of hostile machines accounted for could not be determined by our pilots. Other Allied machines which arrived too late to take part in the fight saw from a distance several machines falling out of control.

Oct. 15th, 9.13 p.m.—On the 14th inst. there was a slight improvement in the weather.

Artillery work and photography were carried out by our aeroplanes, and 1½ tons of bombs were dropped on Ledeghen railway station and on hostile billets east of Lens

In air fighting three German aeroplanes were brought down and one was driven out of control.

Two of our machines are missing.

War Office Communiqués.

Oct. 10th.—The G.O.C. the British Forces in German East Africa reports:

Our aircraft have bombed Massassi and the enemy camps in its vicinity with excellent effect.

Oct. 12th.—The Secretary of the War Office makes the following announcement:—

Lieut.-General Sir David Henderson, K.C.B., D.S.O., having been deputed to undertake special work, has been lent for such service, and has thereby vacated his seat on the Army Council.

The Secretary of State for War has appointed Major-General J. M. Salmond as his successor as Director-General of Military Aeronautics, with a seat on the Army Council.

Major-General Brancker, at present Deputy Director of Military Aeronautics, has been appointed to a command abroad, and for the present his place will not be filled.

Oct. 15th.—The G.O.C. the British Forces in Macedonia reports:—

Doiran-Vardar Front.—Our aeroplanes have dropped bombs on a dump at Tchestovo (north-west of the lake) and on a railway train entering that place.

The Casualty List.

Reported Oct. 10th.

Killed.—Loyd, Capt. A. P. Buffs (E. Kent R.) and R.F.C.
Noble, Sec. Lt. H. T., R.F.C.
Tomlin, Sec. Lt. H. F., R.F.C.

Wounded.—Andrews, Sec. Lt. C. B., North'd. Fus., attd. R.F.C.
Harrison, Sec. Lt. A. W., R.F.C.
Ord, Sec. Lt. B., R.F.C.

Missing.—Campbell, Capt. J. S., A. and S. High. and R.F.C.
Haight, Sec. Lt. J. L., R.F.C.
Hood, Sec. Lt. R. P., R.F.C.

Reported Oct. 11th.

Killed.—Barnard, Sec. Lt. E. A., R.F.A., attd. R.F.C.

Previously reported Missing, now reported Killed.—
Allcock, Capt. W. T. L., R.F.C.
Applin, Sec. Lt. R., R.F.C.
Berry, Sec. Lt. O. W., K.O. Sco. Bord., attd. R.F.C.
Brewis, Lt. J. A. G., Durh. L.I., attd. R.F.C.
Chaworth-Musters, Sec. Lt. R. M., Leic., attd. R.F.C.
Cramb, Sec. Lt. W. B., Arg. and Suthd. Highrs., attd. R.F.C.
Cull, Capt. A. T., Sea. Highrs., attd. R.F.C.
Edwards, Capt. D. W., M.C., A.S.C., attd. R.F.C.
Holmes, Lt. T. G., R.F.C.
Horncastle, Capt. L. H., M.C., Wilts, attd. R.F.C.
Matthews, Sec. Lt. F. A., R. Suss., attd. R.F.C.
Palmer, Sec. Lt. P. R., M.C., Leic., attd. R.F.C.
Sherman, Sec. Lt. P., R.F.C.
Stuart, Capt. J., R. Innis. Fus., attd. R.F.C.
Turner, Lt. W. G. D., R.F.C.

Wounded.—Burrell, Lt. E. L., R.F.C.
Wade, Lt. H. H., R.F.C.

Missing.—Frost, Sec. Lt. J., R.F.C.
Smith, Sec. Lt. F. L., R.F.C.

Previously reported Missing, now reported Prisoner of War in German Hands.—McMichael, Lt. G. B., Hereford., attd. R.F.C.

Previously reported Prisoner of War, now reported Wounded and Prisoner of War in German Hands.—Stead, Sec. Lt. G. C., R.F.C.

Previously reported Missing, now reported Prisoners of War in German Hands.—Felton, Sec. Lt. C. T., R.F.C.
Hart-Davies, Sec. Lt. H. R., R.F.A., attd. R.F.C.

Reported Oct. 12th.

Killed.—Flynn, Sec. Lt. J. H., R.F.C.
Pember, Lt. E. H., R.F.A., attd. R.F.C.
Woodcock, Sec. Lt. V. J., North'd Fus., attd. R.F.C.

Previously reported Missing, now reported Killed.—
Barwell, Capt. F. L., Lond. R., attd. R.F.C.
Buxton, Sec. Lt. G. B., Norf. R., attd. R.F.C.
Clark, Sec. Lt. W. H., Mx. R., attd. R.F.C.
Hatch, Lt. G. J., Lond. R., attd. R.F.C.
Holt, Capt. W. P., A.S.C., attd. R.F.C.
Marshall, Sec. Lt. J. A., Cyc. Bn., attd. R.F.C.
Shirley, Sec. Lt. A. V., Yeo., attd. R.F.C.
Wood, Lt. M. H., Linc. R., attd. R.F.C.

Died of Wounds.—Chapman, Maj. C. M. B., M.C., Buffs, attd. R.F.C.
Hickie, Sec. Lt. C. S., R.F.C.

Wounded.—Bayetto, Capt. T. P. H., R.F.C
Bean, Sec. Lt. C. O., R.F.C.
Browne, Sec. Lt. A. R., R.F.C.
Clemetson, Sec. Lt. L. H., R.F.C.
Cudemore, Sec. Lt. J. R., R.F.C.
Flynn, Sec. Lt. J. P., Ches. R., attd. R.F.C.
Gillings, Sec. Lt. G. A., R.F.C.
Leven, Sec. Lt. G. C., R. Suss. R., attd. R.F.C.
Sogno, Sec. Lt. G. F., R.F.C.
Townsend, Sec. Lt. R. G. R., R.F.C.

Missing.—Boumphrey, Lt. J. W., Yeo., attd. R.F.C.
Ellerbeck, Sec. Lt. E. A. V., Yeo., attd. R.F.C.
Warter, Sec. Lt. J. G., Wilts R., attd. R.F.C.
Westcott, Lt. G. F., R.F.C.

Previously reported Missing, now reported Prisoner in German Hands.—Rushworth, Capt. H. M., Lond. R., attd. R.F.C.

Reported Oct. 13th.

Killed.—Hughes, Lt. J. L., Welsh R., attd. R.F.C.
Rayner, Sec. Lt. C. O., R.F.C.

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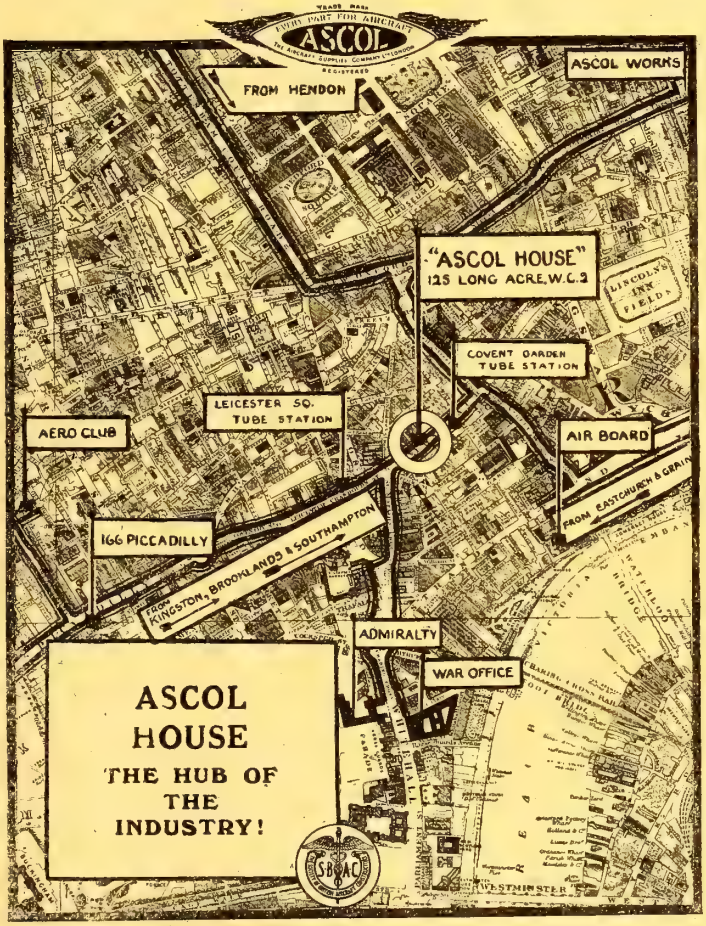
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Neal, Sec. Lt. E. D., R.F.C.
Peel, Sec. Lt. E. O., R.F.C.
Scandrett, Sec. Lt. H., R.F.C.
Watson, Lt. C., M.C., R.F.C.
MISSING.—Bushe, Sec. Lt. J. F., R.F.C.
Colbert, Sec. Lt. L. A., R.F.C.
Sloley, Sec. Lt. R. H., R.G.A., attd. R.F.C.
INDIAN FORCE.—WOUNDED.—Steele, Sec. Lt. R. B., I.A.R.O., attd. R.F.C.
CANADIAN CONTINGENT.—PREVIOUSLY REPORTED MISSING, NOW REPORTED DIED.—Fotheringham, Lt. J. B., Quebec Regt., attd. R.F.C.

Reported Oct. 15th.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—Beatty, Sec. Lt. B. G., R.F.C.
Boyd, Sec. Lt. P. B., Gord. High., attd. R.F.C.
Cheatle, Sec. Lt. C. C., R.F.C.
Clifford, Sec. Lt. W. J., R.F.C.
Jeffery, Sec. Lt. R. E., R.F.C.
Lovell, Sec. Lt. L. G., R.F.C.
Munn, Sec. Lt. L. V., Leic. R., attd. R.F.C.
Pascoe, Sec. Lt. E. J., R.F.C.
Phalen, Sec. Lt. R. U., R.F.C.
WOUNDED.—Davies, Sec. Lt. R. C., R.F.C.
Martin, Sec. Lt. F. A., R.F.C.
Merton, Capt. G., M.C., R.F.C.
Reason, Sec. Lt. D. J., R.F.C.
MISSING.—Bishop, Sec. Lt. W. R., R.F.C.
Casey, Sec. Lt. P. J., R.F.C.
Crane, Sec. Lt. C. G., R.F.C.
Halley, Sec. Lt. C. R. B., R.F.C.
Inglis, Sec. Lt. W. L., R. Sco. Fus., attd. R.F.C.
McKenna, Lt. J. M., R.F.C.
MacAndrew, Sec. Lt. C. G. O., Yeo., attd. R.F.C.
Mathews, Sec. Lt. G., R.F.A., attd. R.F.C.
Sidney, Sec. Lt. L. P., K.R.R.C., attd. R.F.C.
Sutcliffe, Sec. Lt. S., R. Welsh Fus., attd. R.F.C.
PREVIOUSLY REPORTED MISSING, NOW REPORTED WOUNDED AND PRISONERS IN GERMAN HANDS.—Hutchinson, Lt. C. D., S. Staff. R., attd. R.F.C.
Wyman, Sec. Lt. J. B. H., R.F.C.
PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONERS IN GERMAN HANDS.—Denison, Sec Lt. E. B., R.F.C.
Dronsfield, Sec. Lt. S. W., R.F.C.
Ellam, Sec. Lt. H. J., R.F.C.
Mallous, Sec. Lt. C. G., R.F.C.
Rose, Sec. Lt. G. A., R.F.C.
Sen, Sec. Lt. E. S. C., R.F.C.
Smith, Sec. Lt. W. C., R.F.C
Taylor, Sec. Lt. S. H., R.F.C.
CANADIAN CONTINGENT.—PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—Elliott, Lt. J. McC., Cav., attd. R.F.C.
WOUNDED.—Henry, Lt. H., W. Ont. R., attd. R.F.C
MISSING.—Scott, Lt. C. D., Cent Ont. Regt., attd. R.F.C.

Reported Oct. 16th.

KILLED.—Dawson, Sec. Lt. H. W., R.F.C.
WOUNDED.—Horsfall, Sec. Lt. G. R., Y. and L. R., attd. R.F.C.
Smith, Lt. H. W., Sher. For., attd. R.F.C.
MISSING.—Nash, Sec. Lt. F. M., R.F.C.

CASUALTIES AMONG WARRANT OFFICERS, N.C.O.'s AND MEN. THE DATES ARE THOSE OF THE OFFICIAL LIST.

DIED OF WOUNDS.

OCT. 4th.—R.F.C.—Studholme 77451 Sjt. W. (Wigton).
R.F.C., ATTD. R.G.A.—Smith 65070 2nd Cl. Air Mech. C. W. (Kenley).

PREVIOUSLY REPORTED WOUNDED, NOW REPORTED DIED OF WOUNDS.

OCT. 1st.—R.F.C.—Brown 78600 1st Cl. Air Mech. G. (Belper).

ACCIDENTALLY KILLED.

OCT. 5th.—R.F.C.—Crookes 48564 1st Cl. Air Mech. H. (Ilkeston).

DIED.

OCT. 4th.—R.F.C.—Blight 30241 2nd Cl. Air Mech. R. (St. Saviour's Hill, Jersey); Payne 19737 1st Cl. Air Mech. J. W. (Margate).

WOUNDED.

OCT. 4th.—R.F.C.—Juby 8574 Flt. Sjt. J. P. (Wandsworth, S.W.); Keyse 10566 1st Cl. Air Mech. S. (Tooting, S.W.); Selway 43662 2nd Cl. Air Mech. W. E. (Brixton Hill, S.W.); Yeomans 7492 Sjt. A. (Leeds).
R.F.C., ATTD. R.G.A.—Blackwell 10585 2nd Cl. Air Mech. R. (Gloucester).
OCT. 5th.—Clarkin 43537 2nd Cl. Air Mech. H. (Manchester); Croome 10294 1st Cl. Air Mech. C. F. (Gloucester); Fisher 78099 2nd Cl. Air Mech. J. L. (Didsbury); Goacher 65040 2nd Cl. Air Mech. J. R. G. (Belgrave, S.W.); Harrop 49486 Lce-Cpl. W. (Marple); Moir 23232 Sjt. A. A. L. (Kenley); Richmond 27235 Flt. Sjt. E. H. (Leyton, E.); Young 38557 2nd Cl. Air Mech. E. A. (Barnsbury, N.).
R.F.C., ATTD. R.F.A.—Radbourne 11300 2nd Cl. Air Mech. H. J. (Putney, S.W.).
OCT. 6th.—R.F.C.—Lee 11862 1st Cl. Air Mech. T. H. (Willesden, N.W.); Poole 65062 2nd Cl. Air Mech. H. W. (Chard).

MISSING.

OCT. 3rd.—R.F.C.—Jeacock 12187 2nd Cl. Air Mech. J. (Birmingham).
OCT. 5th.—Foulsham 87650 Sjt. H. S. (East Dulwich, S.E.); Heedy 11730 2nd Cl. Air Mech. J. (Failsworth).

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONERS OF WAR IN GERMAN HANDS.

OCT. 2nd.—R.F.C.—Organ 4630 Farr.-Sjt. W. (Shurdington).
OCT. 6th.—Richman 61852 2nd Cl. Air Mech. W. (Ulverston).

PERSONAL NOTICES.

DEATHS.

ARMITAGE.—Sec. Lt Eric Armitage, R.F.C., who died of wounds on Oct. 4th, was the third son of Geo. Armitage, Westfield House, Rothwell, near Leeds. He was 19 years of age.

BASCOMBE.—A verdict of "Accidental death" was returned on Oct. 12th in Lincolnshire at an inquest on the body of Sec. Lt. Cecil R. Bascombe, R.F.C., who was killed while flying on Oct. 10th. He was the only son of Mr. and Mrs. Reginald Bascombe, of Alvington House, Bury St. Edmunds, and was 19 years of age.

BIRD.—Lt. Dudley Joseph de Angulo Bird, R.F.A. and R.F.C., who was previously reported missing and is now reported killed in action on June 27th, was the fourth son of William Bird, of Metton, Norfolk. He was 23 years of age.

BULLOCK-WEBSTER.—Lt. Frank Hamilon Bullock-Webster, Canadian M.G.C., attd. R.F.C., who was shot down while fighting an enemy aeroplane on Sept. 20th, and died of wounds the same day, was the eldest son of H. Bullock-Webster, of Auckland, New Zealand, and nephew of Mrs. Allaway, of Llanbedr, Merionethshire. Born in the Waikato, in 1885, he was in British Columbia when war was declared, and immediately enlisted, but was soon given a commission in a Canadian battalion, and came to England in the autumn of 1915. He was transferred to the M.G.C., and went to France in August, 1916, and was invalided home with trench fever in November. When he recovered he was transferred to the R.F.C. He went to the front again last July.

CHOWN.—Sec. Lt. F. J. Chown, R.F.C., who was killed in an air fight on September 20th, aged 19, was the only son of Dr. and Mrs. Chown, of Townshend, near Hayle, Cornwall. He was educated at Temple Grove and St. Paul's School. He passed for Sandhurst, but entered the R.F.C. direct from school in July, 1916, and graduated as a pilot last May. After a short period of service as instructor, he volunteered as a scout, and went to the front only a month before his death.

CLARKE.—Lt. Francis Charles Erlin Clarke, Worcestershire Regt., attd. R.F.C., who died of wounds on Oct. 11th, was only son of Mr. and Mrs. C. T. Erlin Clarke, of Lark Hill, Worcester. He was 21 years of age. He was promoted in the Worcesters in June, 1915, and had his "wings" in the R.F.C. in April of this year.

COX.—Sec. Lt. Derek Percy Cox, R.F.C., returned as missing on August 21st last, is now reported to have been killed on that day. He was the only son of Major-General Sir Percy Cox (now on active service as Political Officer) and Lady Cox, and was 21 years of age. He was educated at Harrow, Woolwich, and Sandhurst, joined the Machine Gun Corps early in 1915, and remained with this corps until he was transferred to the R.F.C. in May, 1916. In October, 1916, he was invalided home, and after two months' leave rejoined the R.F.C. in England.

His commanding officer writes :—"Your husband was a splendid pilot and had done extremely good work. He is a very great loss to the squadron, both on account of his capabilities and his personality, which endeared him to everybody."

DENNIS.—Sec. Lt. Charles Cowley Dennis, R.F.C., son of Mrs. H. Dennis, of Ilford, was killed on September 25th. Born in 1895, he was educated at Christ's Hospital from 1905 to 1910. He joined the London Irish Rifles in the spring of 1915, and was subsequently granted a commission in the 19th London Regiment. He was wounded in action, came home for a short time, and then transferred to the Royal Flying Corps After a successful engagement with the enemy he was brought down in "No Man's Land" and instantly killed. His body was subsequently recovered by the French.

DE TEISSIER.—Sec. Lt. Aubrey de Teissier, R.F.C., after a flight in South-east Essex on Oct. 13th, was descending from a height of only 150 ft. when his machine side-slipped and fell to the ground, and the pilot died before he reached the hospital to which he was taken.

FOUBISTER.—A verdict of "Accidental death" was returned at an inquest held in Outer London on Oct. 11th on the body of Sec. Lt. John L. Foubister, R.F.C., a New Zealander, who was training as a pilot. The evidence showed that Mr. Foubister

was instructed not to attempt to turn until he had reached a height of 1,000 ft., but when he was about 500 ft. up he turned, and a gust of wind caught his machine, which fell into a field.

GAYNER.—Sec. Lt. W. J. Gayner, Somerset L.I., attd. R.F.C., reported missing on May 9th, is now reported killed on that date. He was the son of Mr. W. A. Gayner, of Bath, and went to India with the Somerset L.I., but returned to England for a commission. Afterwards he went to Mesopotamia, and going back to Alexandria he passed through the school of flying. Again returning to England he was engaged for some time in training pilots, and he went to the front in April. He was 23 years old.

GIBSON.—Sec. Lt. Edgar Daniell Gibson, R.F.C., was killed on Oct. 9th, aged 19. He was the third and youngest son of Mr. Walter M. Gibson, M.V.O., I.S.O., and Mrs. Gibson, of The Croft, Oxted, Surrey. Educated at St. Christopher's, Eastbourne, and Wellington College (Hardinge Dormitory), he joined the R.F.C. on leaving school, was gazetted on Aug. 1st, and went to the front on Aug. 22nd. His eldest brother, Lt. Malcolm Reginald Gibson, East Surrey Regt., was killed on Oct. 8th, 1915.

GRIFFIN.—Capt. Cecil S. J. Griffin, Gordon Highlanders, attd. R.F.C., who died in Croydon War Hospital on October 11th, as the result of an accident while flying, was the only son of Lt.-Col. C. P. G. Griffin (now attd. to the Suffolk Yeomanry) and Mrs. Griffin, of Berridon Hall, Bradworthy, Devon, and was 22 years of age. He was educated at Tonbridge, and married the only daughter of the late Mr. S. Oxenham. He was gazetted to the Gordon Highlanders in May, 1914, and served with the regiment on the Aisne, Marne, and before Ypres, being wounded in September, 1914. He joined the R.F.C. early last year and saw service at the front.

An inquest was held at Croydon on Oct. 13th. According to the evidence, Capt. Griffin was leaving a Surrey aerodrome when the engine misfired badly. At a height of about 150 ft., and when some 400 yards from the aerodrome boundary, Capt. Griffin tried to turn. The wind, however, caught the tail of the machine and made it nose-dive, the pilot being too near the ground to be able to recover. When lying in the hospital afterwards, Capt. Griffin said that by mistake he failed to do the right thing on finding himself in difficulties. All the R.F.C. witnesses agreed that Capt. Griffin was a good, safe pilot. A verdict of accidental death was returned.

JARVIS.—Capt. A. B. Jarvis, Middlesex Regt. and R.F.C., who was killed in action on August 10th, was the fourth son of the late E. F. and Mrs. Jarvis, of Albert House, Cromer. He was 24 years of age.

MACKENZIE and GARLIE.—Capt. M. Mackenzie, R.F.C., aged 28, and Capt. André Garlie, aged 33, of the French flying service, who came to England to study British methods, were killed in a flying accident on the South Coast on Oct. 13th. Their machine nose-dived and came to earth, and both died on the way to hospital.

A verdict of accidental death was returned at the inquest on Oct. 15th.

MAYNE.—Sec. Lt. Denis John Heriot Mayne, Royal Irish Rifles, attd. R.F.C., who was killed while flying in Middlesex on Oct. 11th, was the only surviving son of the Rev. J. St. C. Mayne and Mrs. Mayne, of 29, Cavendish Road West, N.W.8. He was 18 years of age.

MIALL-SMITH.—Lt. G. Eric Miall-Smith,, M.C., Norfolk Regt., attd. R.F.C., whose death was announced last week, was brought down in air-fighting over the German lines on September 25th, being mortally injured. His German antagonist was also shot and both machines came to earth side by side. He was educated at University College School. He had been twice wounded while serving with the Norfolk Regiment and was awarded the M.C. for brave and skilful conduct on July 1st, 1916, when he organised some scattered units, took a German strong point and 160 prisoners. His only brother, Arnold, lieutenant in the Royal Fusiliers, was killed on September 26th, 1916.

MOODY.—Sec. Lt. Charles Angelo Moody, R.F.C., previously reported missing, is now reported by the Germans to have been killed in air fighting on August 31st. The son of the Rev. H. Moody, vicar of Welshampton, Ellesmere, he was educated at King William's College, Castletown, Isle of Man, where he was in the football fifteen in 1915-16 and the cricket eleven in 1916. A lance-corporal in the O.T.C., he joined the R.F.C. in December, 1916, and went to the front last July. His twin brother is also in the R.F.C.

PIERSON.—Sec. Lt. Christopher Frank Kirshaw Pierson, R.F.C., killed on Oct. 10th, was the youngest son of the Rev. Kirshaw T. Pierson and Mrs. Pierson, of The Grampians, Hastings. Born in 1899, he was educated at St. George's, Windsor, and at Christ's Hospital, Horsham. He was trained in the Cadet Corps at Jesus College, Oxford, and was gazetted last April, and at once proceeded to the front.

His Squadron Commander writes:—"Your son was a most able and reliable pilot and one of my best officers. He had always done his work well and cheerfully. . . . A good artillery observer and brave to a fault."

RICHARDSON.—Sec. Lt. William Quintus Newsum Richardson, R.F.C., who was killed while flying at Essex Goldhanger, on Oct. 6th, was the eldest son of the late W. S. Richardson, Esq., of Lindum House, Lincoln, and Mrs. Richardson, of Bradfield, Berks. He was 19 years of age.

RUSSELL.—Lt. Eric Russell, M.C., R.F.C., who died of wounds on Oct. 7th, was the youngest son of the late C. H. Wilkinson and Mrs. Wilkinson, of 55, St. Mary's Mansions, W.2.

STEAD.—Lt. John Kenneth Stead, 4th Batt. Yorks Regt., attd. R.F.C., died of wounds in France on February 4th, 1917. Prior to the war, Mr. Stead was a student at Armstrong College. He was elected a Graduate Member of the Institution in October, 1913.

STEWARD.—Sec. Lt. A. A. Steward, R.F.A., attd. R.F.C., who was killed on Oct. 6th, was the younger son of Canon Steward, of Boyton Rectory, Codford, Wilts, and of the late Mrs. Steward. He was educated at Wellington and Magdalen College, Oxford. He held a commission in the Norfolk Militia during the South African War, in which he saw active service. He was subsequently ordained by the Archbishop of York to a curacy in Hull, and at the outbreak of the war was on the staff of St. Mary's, Johannesburg. He returned to England, offered his services as a combatant officer, and was given a commission in 1915 in the R.F.A., proceeding to the front in April, 1916. He was transferred recently to the R.F.C. as an observation officer. He married in 1912 Miriam, third daughter of the late S. H. Carver, of Alexandria, and of Mrs. Carver, The Moat, Downton, and leaves three daughters.



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An S. I. A. Biplane, with Fiat Engine, of the type made famous by Captain Laureati.

WOOD.—Lt. Maurice Herbert Wood, Lincoln Regt., attd. R.F.C., reported missing on April 13th last, is now known to have been killed four miles over the enemy lines on that day. He was the fourth son of Mr. and Mrs. A. W. Wood, of Eversley, Grove Hill, Woodford, Essex, and was educated at Bancroft's School and University College, London, taking his B.A. degree with honours in history and French. At University College he belonged to the O.T.C., and he was on the staff of the Grammar School, Stamford, Lincolnshire. He received his commission before the outbreak of war, and went to the front in February, 1915, as bombing officer to his battalion. Later he was appointed second in command of a grenade school, and was mentioned in dispatches. He came home July, 1916, to join the R.F.C., and returned to the front early in the year. He was married last February to Hilda, elder daughter of the late T. O. Newman and Mrs. Newman, The Hollies, Stanstead, Essex.

WORMULL.—Lt. C. F. Wormull, R.F.C., who died on Oct. 4th, at Stamford Infirmary, from the effects of injuries received through the falling of his aeroplane, was the eldest son of F. A. S. and Mrs. Wormull, of Catford.

Engagements.

CORBY—KNECHTLI.—An engagement is announced between Hugh George Corby, Captain, Royal Munster Fusiliers, attd. R.F.C., and Beryl Kathleen, only daughter of Mr. and Mrs. Jack Knechtli, of 52, Carson Road, West Dulwich.

FARROW—MURRAY.—An engagement is announced between Mr. R. C. Farrow, C.F.A., attd. R.F.C., and Miss Mary Hay Murray, youngest daughter of the late Evelyn Hay Murray, of Hascombe, Godalming.

IRONS—SMITH.—The marriage of Capt. Roy Irons, R.F.C., and the Hon. Winifred Smith will take place quietly at St. Peter's Church, Eaton Square, on Wednesday, the 24th inst., at a quarter past two o'clock. All friends will be welcome at the church.

MARTIN—BARRY.—An engagement is announced between Capt. G. Neville Martin, Durham Light Infantry and R.F.C., only son of the late Mr. G. H. Martin and of Mrs. Martin, of Bedford, and Aldis, daughter of Mr. and Mrs. C. J. Barry, of Hampstead, N.W.

SAMWAYS—LOGAN.—A marriage has been arranged, and will take place on November 10th, between George Richmond Samways, R.F.C., and Heléne, younger daughter of Captain William Logan, late of the Gordon Highlanders.

SPENCER—BEATTIE.—A marriage has been arranged, and will take place very quietly on November 10th in London, between Harold Sherwood Spencer, Captain, Royal Irish Fusiliers, attd. R.F.C., and Ella Shearer, eldest daughter of Mr. and Mrs. James Beattie, of Canmore, St. Andrews, and 4, Buckingham Street, Buckingham Gate, London, S.W.

WARD—NICHOLSON.—A marriage has been arranged, and will shortly take place, between Capt. Herbert Sanford Ward, R.F.C., elder son of Herbert Ward, of 105, Avenue de Malakoff, Paris, and Joyce, younger daughter of Sir Charles Norris Nicholson, Bt., M.P., of 35, Harrington Gardens, S.W.

Marriages.

ADDINSELL.—BLACK.—On Oct. 13th, at St. Paul's, Knightsbridge, Lt. I. E. Addinsell, the Royal Munster Fusiliers, attd. R.F.C., son of Mr. and Mrs. W. A. Addinsell, was married to Muriel, daughter of Mr. and Mrs. R. J. Black, by Prebendary Leith Boyd.

HILL—MORTON.—On Sept. 26th, at Houghton Church, Stockbridge, Major R. M. Hill, M.C., R.F.C., was married to Helen, elder daughter of Lieut.-Col. E. R. Morton, by the Rev. E. H. Firth.

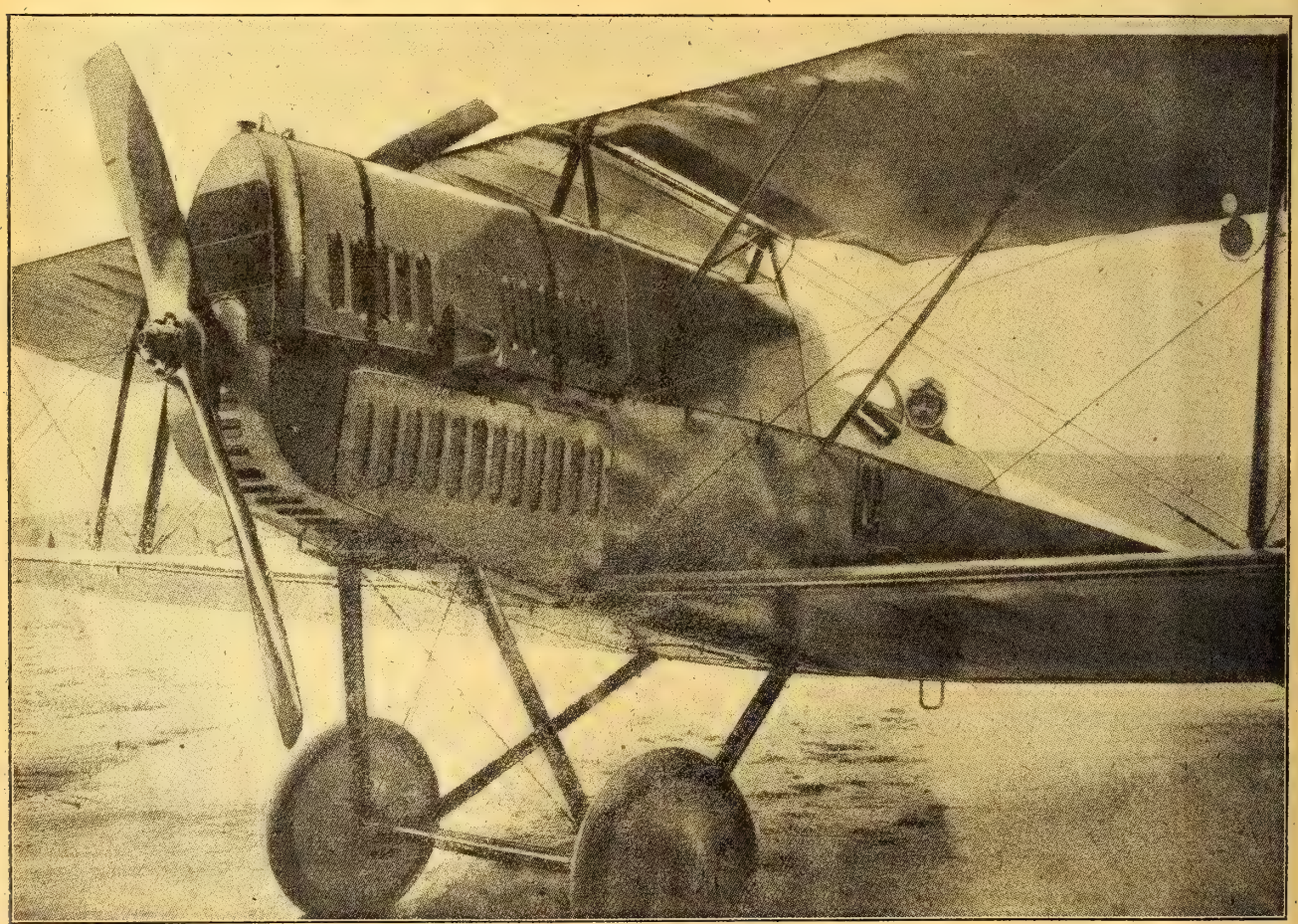
ROME—STILES.—The marriage between Lt. S. G. Rome, M.C., Argyll and Sutherland Highlanders and R.F.C., younger son of Col. and Mrs. Rome, Knockbay, Campbeltown, Argyllshire, and Dorothy Jalland, only daughter of Lt.-Col. Harold J. Stiles, M.B., F.R.C.S.Ed., R.A.M.C. (Temp.), and Mrs. Stiles, 9, Great Stuart Street, Edinburgh and Whatton Lodge, Gullane, took place on Wednesday, Oct. 17th, at St. Giles's Cathedral, Edinburgh.

WINGATE—GARRATT.—On the 11th inst., at St. Andrew's Church, Hertford, Sec. Lt. George J. Wingate, Essex Regt., attd. R.F.C., third son of the late Mr. Wingate and Mrs. Wingate, of Amhurst Park, London, N., was married to Betty, youngest daughter of the late Mr. W. Garratt and Mrs Garratt, of The Walnuts, Hertford, by the Rev. N. T Gardiner.

Birth.

MACDONALD.—On Oct. 1st, at 4, Prince Edward's Mansions, Palace Court, W., the wife of Capt. G. K. Macdonald, Sherwood Foresters and R.F.C.—a daughter.

(*Continued on page 1140.*)

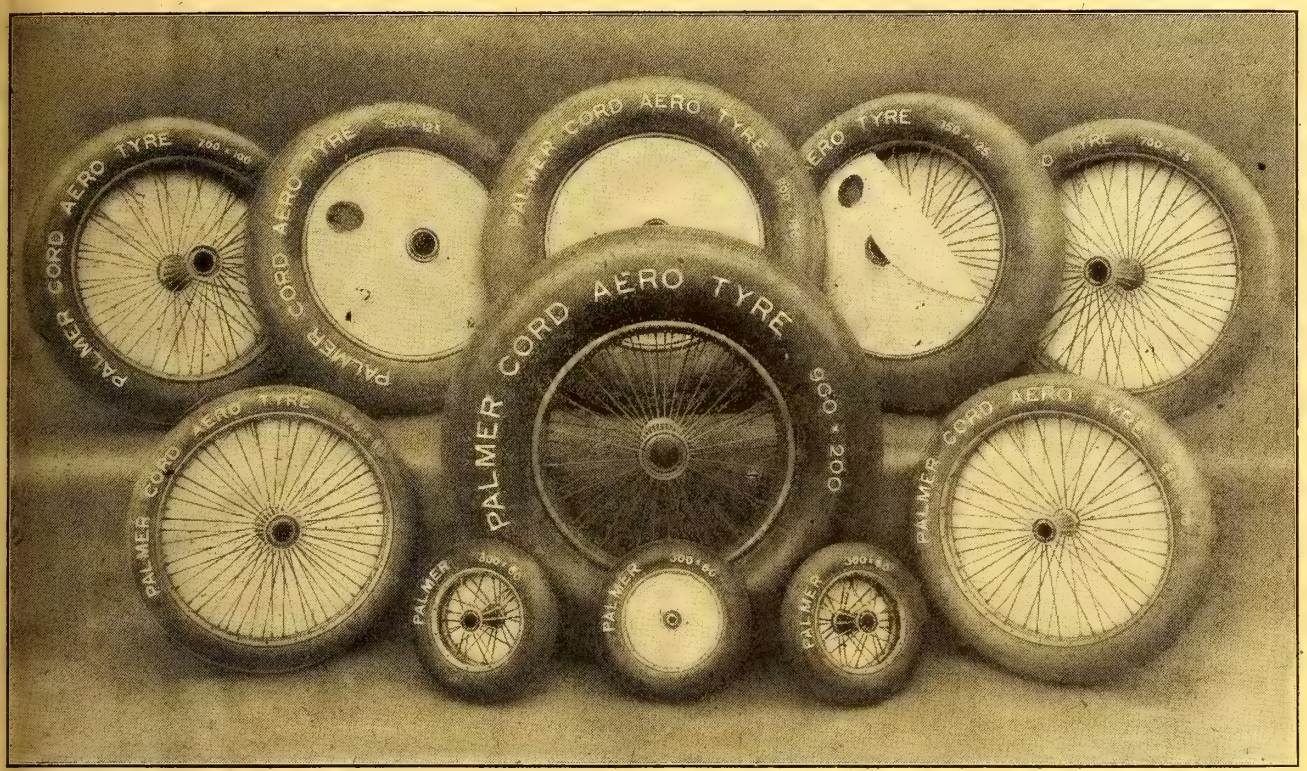


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The Nose of an S. I. A. Biplane with Fiat Engine.

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300×60	16	111.12	25.4	Central
,,	17	72.39	12.7	Central
450×60	30	89.	31.75	Central
575×60	111	150.	38.09	104/46
,,	21	160.	28.	Central
,,	34	150.	31.75	104/46
650×65	78	178.	44.45	132/46
,,	100	178.	38.09	132/46
,,	101	178.	31.75	132/46
600×75	111	150.	38.09	104/46
,,	21	160.	28.	Central
,,	34	150.	31.75	104/46
700×75	78	178.	44.45	132/46
,,	100	178.	38.09	132/46
,,	101	178.	31.75	132/46

Tyre Sizes	Wheel No.	Hub		Track Line
		Length	Bore	
		m/m	m/m	m/m
700×75	*80	178.	44.45	132/46
,,	*91	178.	31.75	132/46
,,	*98	178.	44.45	Central
700×100	92	185.	55.	135/50
,,	95	185.	55.	Central
,,	77	178.	44.45	132/46
,,	93	150.	40.	Central
,,	33	150.	38.09	Central
,,	99	178.	38.89	132/46
,,	96	178.	55.	132/46
750×125	92	185.	55.	135/50
,,	95	185.	55.	Central
,,	77	178.	44.45	132/46
,,	93	150.	40.	Central
,,	33	150.	38.09	entral
,,	99	178.	38.89	132/46

Tyre Sizes	Wheel No.	Hub		Track Line
		Length	Bore	
		m/m	m/m	m/m
750×125	96	178.	55.	132/46
800×150	82	185.	55.	135/50
,,	85	185.	55.	Central
,,	†36	185.	55.	135/50
,,	†40	185.	60.32	135/50
1000×150	97	250.	65.4	Central
,,	102	185.	55.	125/60
,,	201	185.	60.32	125/60
900×200	39	185.	55.	Central
,,	42	185.	60.32	125/60
,,	47	185.	55.	125/60
,,	202	185.	60.32	Central
1100×200	52	185.	55.	116/69
,,	57	185.	55.	Central
,,	203	185.	60.32	116/69
,,	204	185.	60.32	Central

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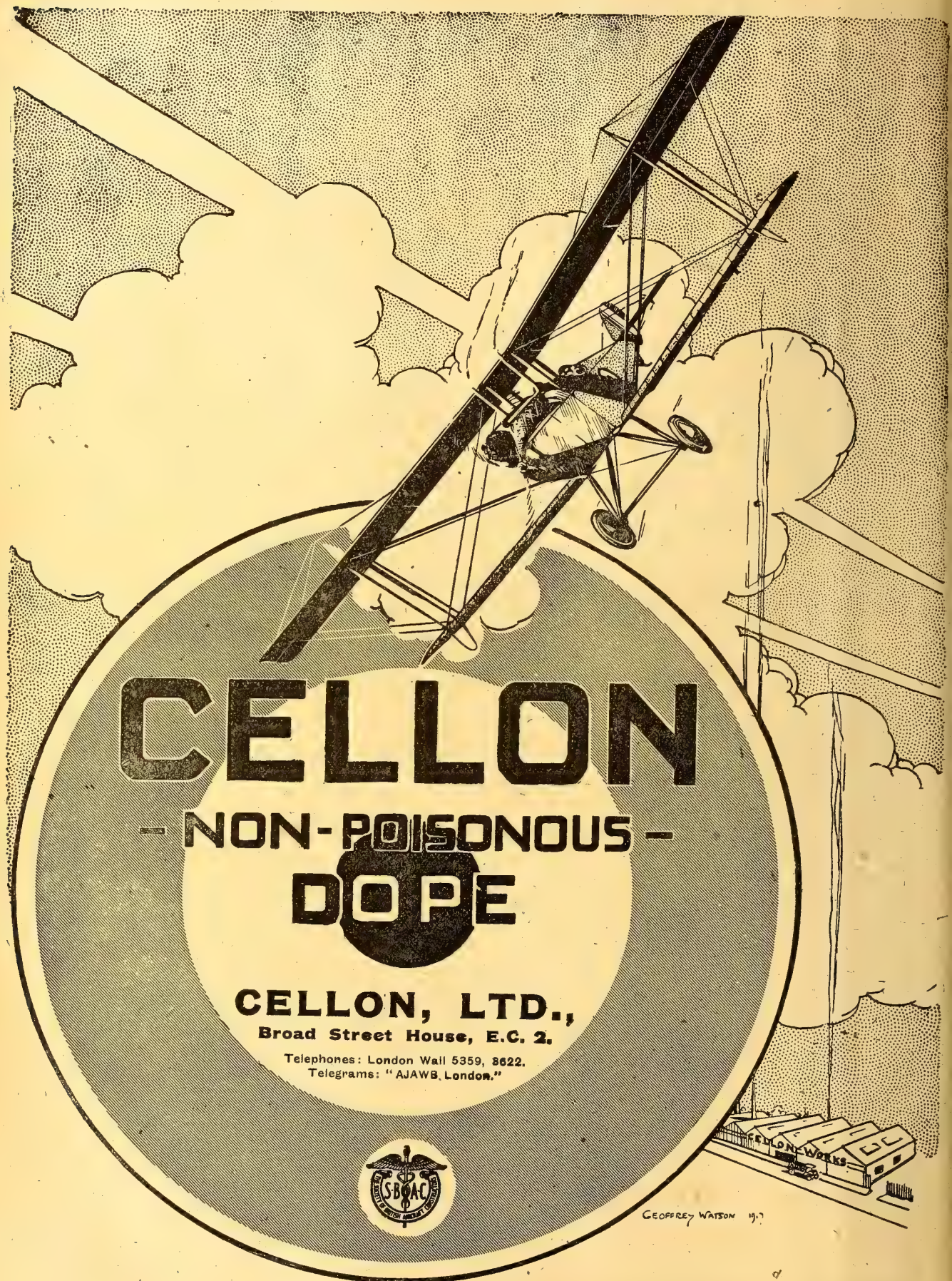
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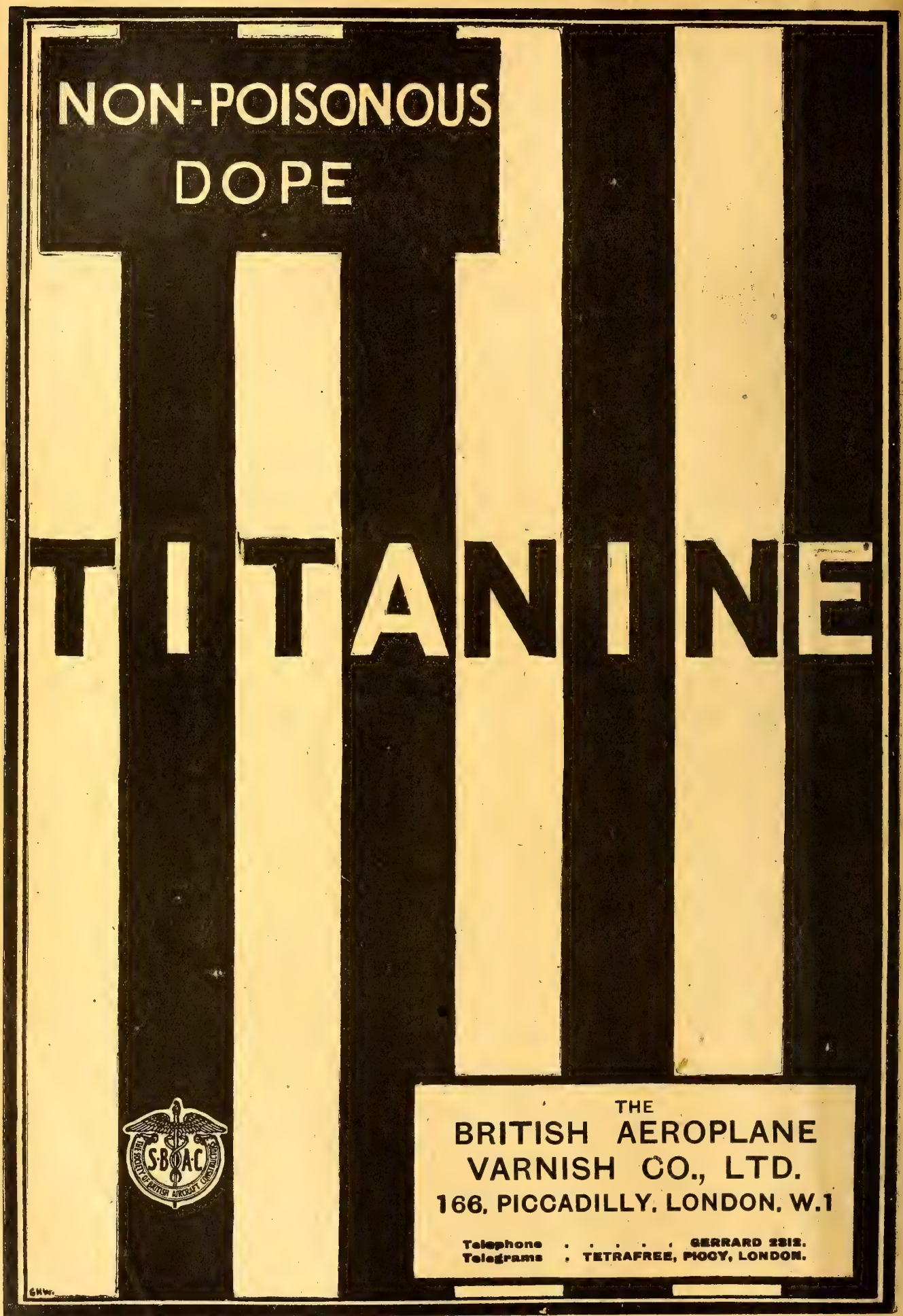
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THE TRAINING OF APPRENTICES.

BY A. W. T.

[Every employer of labour has, in these days and for some years ack, experienced great difficulty in finding men who really know ieir jobs. This general state of ignorance among the younger eneration is due to the excellent old-fashioned system of apprenticeship falling into disuse. It is therefore of national interest know that an earnest attempt is being made in the Aircraft ndustry to revive the system of indentured apprenticeships.

The system which is explained hereafter has been evolved y the Gnome Engine Co., Ltd. (Peter Hooker, Ltd.) of 'althamstow, and is designed to enable every boy in the employ the firm to start with an equal chance of making good in ter life. Those who are interested in promoting the future elfare of youths of good character are strongly advised to try id influence them to apprentice themselves to a really good firm, id any wishing to spread the knowledge of what is offered by e Gnome Company to their apprentices can obtain the following formation and further details in pamphlet form from Peter ooker, Ltd., of Walthamstow.—C. G. G.]

PREFACE.

As the value to a boy of a proper apprenticeship, and the fect it has on his future career and future earning powers, are ot always fully appreciated by parents and guardians, the follow- g may be of assistance to them.

The old and thorough system of apprenticeship which was in gue prior to the last thirty years has been allowed to become acker in nearly every trade, and especially in engineering. ie result is that, taking into consideration the vast number of en who are engaged in the engineering and allied trades, it ill be found that the percentage of those who have served a ie and proper apprenticeship is very low, even amongst men io are styled "skilled" mechanics or artisans.

Instead of boys being properly indentured and bound to their asters, no sooner have they left school than they are looked on by some parents and guardians, even at the early age of urteen years, as capable of earning their own living, and are owed to enter various walks of life at the highest wage they n command.

One often finds a boy employed in the office of an engineering m perhaps earning 15s. per week, whilst the apprentice in the op, who after his first year's experience should have become oductive, is probably not earning more than 3s. to 4s. per week. Again a boy becomes a machine-minder, gets onto piecework, d earns what are, to him, large sums of money, which immeately to his juvenile mind represents to *him* his value to his ployer, with the result that he is not satisfied unless he is le to continue to earn that amount. Therefore, not being und in any way to his employers he leaves them, and on the ength of his slight experience hires himself out to another m as a journeyman. Being only partly trained in one branch his trade he is prepared to give up that trade at once should nebody offer him a bigger wage in another occupation.

The effect of this laxity in the employment of boys in engineering works has become more and more noticeable during period of the war. Owing to the necessity for increasing oduction, young lads of all descriptions have been able to obtain ployment in engineering works simply as wage-earners, with le or no training or skill behind them, and with probably no a of continuing in that occupation as their profession after war.

The growth of this lax state of things decided Peter Hooker, d., to look closely into the matter of their boy workers, and as the ult they have decided that in future no boys will be taken into ir works to do work of a productive description unless they are prepared to sign indentures and serve their time as regular bound apprentices.

To require the payment of a premium with an apprentice is to shut the door to many a promising boy who might become a good engineer, but whose parents or guardians cannot afford to pay a premium. The firm has therefore decided that whatever may be a would-be apprentice's social or financial position, they will not require payment of a premium. They have considered, too, the wages hitherto generally paid to apprentices, which are insufficient either to maintain an apprentice away from home, or even to assist his keep while at home. They have therefore prepared the new schedule of apprentices' wages printed in these rules, which is at least 100 per cent. higher than apprentices are generally paid. Further, they have decided to oppose no obstacle to an apprentice being allowed to work on piecework, when he becomes sufficiently proficient, which should enable him to test his own progress and give him confidence in his ability, besides adding to his earnings.

As punctual attendance is essential the apprentices will have the further benefit of any good time-keeping bonus paid by the firm to their employees.

Under the old systems of apprenticeship there was no responsibility on the boy's employers to continue the boy's general education during the first part of his apprenticeship, and to blend it with the beginnings of his technical and workshop education. This point has received careful attention, and it is provided for in these rules and in the form of Indenture adopted that the apprentices will be required to attend continuation classes for both general and technical education, to be arranged for by the firm, and that the necessary time to attend these classes will be allowed. The classes will be either those held by the various technical institutions in the neighbourhood, or classes held by the firm on their own premises.

The company feel sure that parents and guardians who are considering placing their boys in the engineering profession will, after reading the foregoing, and the Rules and Regulations for Apprentices which follow, appreciate and take advantage of the improved facilities for apprenticeship which the company are now offering, and the careful system of instruction which has been arranged so as to make the apprentice's general education and technical training as thorough as possible.

RULES AND REGULATIONS FOR APPRENTICES.

1.—COMMENCING AGE.—Lads should not be eligible for apprenticeship until they are 15 years of age. Any period worked in the factory prior to attaining 15 years to be regarded as a probationary period. Every lad before being apprenticed shall serve a probationary period of at least one month, during which wages shall be paid him at the rate of a first-year apprentice, but if such probationary period takes place after 15 years this period is to be reckoned a part of the apprenticeship.

2.—PERIOD OF APPRENTICESHIP.—The period of apprenticeship will be five years for those of 15 years of age, and for those above that age until they are 21 years of age.

3.—TIME-KEEPING AND GOOD CONDUCT.—The apprentice is required to attend the factory during the working hours, and to work a reasonable amount of overtime per week by consent (see Indenture). Apprentices will also be required to work in their turn on the night shift unless special arrangements are made with their parents for them not to do so. The apprentice will be held strictly to the terms and requirements of his indenture, and bad time-keeping and misconduct of any description will

penalise him from participating in any good-conduct prizes or privileges which may be offered by the firm for good conduct.

4.—WAGES.—In order that it may be possible for all classes of lads to be bound apprentices, no premiums will be required, and apprentices will be paid wages on the following scale, the week being reckoned as 54 hours:

Any period of probation, i.e., before the age of 15 years, 6s. per week.

FIRST YEAR.

If satisfactory.

1st 3 months of apprenticeship ..... 6s. per week.
2nd 3 months of apprenticeship ..... 8s. per week.
3rd 3 months of apprenticeship .....10s. per week.
4th 3 months of apprenticeship .....12s. per week.

SECOND YEAR.

After 3 months, i.e., 15 months' service.

14s. per week.

THIRD YEAR

At commencement .....16s. per week.

FOURTH YEAR.

At commencement .....18s. per week.

FIFTH YEAR.

At commencement .....20s. per week.

The wages will be paid proportionately to the actual hours worked, the week referred to above being considered one of 54 hours. Should, however, the actual weekly working hours of the factory be altered, this figure will be altered to correspond. Any apprentice working on night shift will be paid according to the rules for overtime and night shift as worked in the shop.

Wages will not be paid for time, if any, during which an apprentice is absent owing to illness, other than that provided for under the terms of the indenture, that is to say, the difference between the National Health Insurance payment and his wages for a total period of six weeks in any one year.

5.—CERTIFICATES OF EDUCATION.—All lads offering themselves for apprenticeship shall be required to present satisfactory certificates or other proof of a good general education, and in the event of their being unable to satisfy the firm they will be required to pass an examination at the works on their general knowledge prior to being accepted as an apprentice.

6.—CONTINUATION CLASSES.—Apprentices will be required to attend continuation classes for both general and technical education as shall be arranged for by the firm. The period of attendance of such classes will be fixed by the firm, having regard to the standard of intelligence and industry displayed by the particular apprentice. Time will be allowed during working hours when it is necessary for the apprentice to attend such classes, and arrangements will be made for certain classes to be held in the factory itself for the attendance of apprentices. Certificates of attendance at the classes will be required in the case of any classes held elsewhere than in the factory.

7.—RECORD.—Careful record will be kept of every apprentice in the works both as to his behaviour, zeal, and advancement, and in connection therewith certain marks will be allotted by the works manager on reports from the foreman or other officials each week. Prizes will be offered to those apprentices who are in the same year, such prizes being given for the best reports received of the behaviour and general conduct, time-keeping, and attention to work of the apprentices.

It shall be open to any apprentice in his last year to compete for positions in the drawing office as vacancies occur.

SYLLABUS OF TRAINING.—The following is a syllabus of the training given to apprentices, which is divided into four grades, according to whatever aim the apprentice has in view when starting his apprenticeship. Each apprentice, or his parent or guardian, will be required to state when signing the indenture which grade the apprentice wishes to join. The following gives the probable result of each grade:

Sufficient training for a youth to become a qualified machinist.

Sufficient training for a youth to become a qualified fitter.

Training for a youth who intends to continue his studies in a drawing office. The youth should be at the end of this period an all-round mechanic.

For a youth who wishes to become a fully qualified engineer.

Departments in which Apprentice will receive Training.	1st Grade Apprentice. 5 years in Machine Shop ONLY.	2nd Grade Apprentice. 5 years in Fitting Shop ONLY.	3rd Grade Apprentice. 5 years in Machine and Fitting Shop ONLY.	4th Grade Apprentice 5 years in ALL Departments
Small Tool Stores (Departmental)	3 months	3 months	3 months	1 month
Drilling	3 months	—	3 months	2 months
Milling, Shaping, Planing and Gear Cutting	15 months	—	9 months	9 months
Turrets and Automatics . ..	15 months	—	9 months	9 months
Engine Lathes	15 months	—	9 months	9 months
Grinding	9 months	—	6 months	3 months
Fitting	—	33 months	15 months	9 months
Assembling	—	24 months	6 months	3 months
Electrical Department ..	—	—	—	3 months
View Room	—	—	—	3 months
Tool Room	—	—	—	3 months
Jig and Tool Drawing Office ..	—	—	—	3 months
Engine Detail and Design Drawing Office	—	—	—	3 months

Apprentices in common with the rest of the factory will receive a good time-keeping bonus of ½d. per hour on all hours worked provided that no more than half an hour is lost by the apprentice in any week. Also under the Awards of the Committee on Production a further war bonus amounting to 2s. 6d. per week is paid to apprentices under 18 years of age, and 8s. per week to those over 18 years of age.

AMERICAN INDUSTRIAL NOTES.

According to the "Air Service Journal," New York, of September 13th, the great appropriation made for developing the American Flying Corps is likely to go a good deal further than was expected, a very unusual experience with war appropriations.

It has been found that by reason of the great number of machines to be built and the standardisation of their parts to an enormous extent the cost of the machines will not exceed half the estimates. The American Government officials have high hopes that future orders may be fulfilled at about one-third the previously estimated costs.

One would like to know whether the contracts' department at the Air Board has experienced the same phenomenon.

* * *

Apropos the official announcement that more than 20,000 aeroplanes are now in course of construction in the United States, an additional official statement has been issued by the Secretary of War, which reports highly satisfactory progress.

Contracts have been allotted and work is in progress on the entire number of aeroplanes and motors for which £128,000,000 was provided by the Aviation Bill passed by Congress in July. The types of machines now in process of manufacture cover the entire range of training machines, light high-speed fighting machines, and powerful battle and bombing planes of the heaviest design. The contracts cover an ample number of training machines and embrace many giant battleplanes of a capacity equal to the Caproni, Handley Page, and similar types. The American forces in France will be amply equipped with aircraft.

[Quality as well as quantity is desirable.—Ed.]

The work of the aviation section is said to have been thoroughly systematised. The training of pilots, the building of motors, the construction of wings are proceeding uniformly, so that when the motors are ready the planes will be ready, and when the finished aircraft are ready the aviators and machine-guns will be available. Aeroplanes for the United States are being constructed both in America and abroad. Approximately one-fourth of the number immediately needed will be made abroad.

The United States to-day is in virtual control of many of the materials required for the manufacture of aircraft both for this Government and the Allies. Steps have already been taken for the conservation and distribution of such materials. The aviation service of the Allies may lay claim to "an international general staff" composed of more than 30 air service experts of the Allied nations now in Washington on regular duty with the officers of the American Army and Navy and the members of the Aircraft Production Board. It is said that the best 10 experts of the air services of the Allied countries have been lent to the U.S. Government in order to aid in getting the American aviation programme under way with the fewest possible mistakes and the greatest economy of time.

[One has not missed anyone of importance from England so far.—Ed.]

Thousands of Americans are being registered for flying. Several great universities are turning out cadets steadily. Twenty-four flying schools have been created. Arrangements have also been made with the Allied countries for the final training of American cadets on foreign soil. These men are being trained in American uniforms and will be turned over as finished aviators to the fighting forces in France.

[It is indeed satisfactory to be assured that the American air fleet is being built under such favourable conditions, and one awaits the result with interest.—Ed.]

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The Production of Aeroplanes and their Components

(Seventeenth Instalment.)

BY STEPNEY BLAKENEY.

STORING FINISHED PARTS.

The wings, ailerons, tail plane, elevators, etc., having been received from the dope shop into the finished-part stores, they can here be examined and passed by the inspector. If suitable accommodation and room is available, the wings can be conveniently stored in racks in a horizontal position, the racks being double-sided, preferably fixed with a walking space all round.

In this way the top right and left-hand planes can be stored on one rack, and the bottom right and left-hand planes can be stored in another rack. Thus quite a large number of wings, elevators, or tail planes can be stored in a small space until required in the erecting shop or for dispatch.

Similar racks are useful in the dope room to store planes when a large number are being pigmented or varnished, whilst they are drying. It is far preferable to keep the planes in racks instead of leaning them in piles against walls or partitions, where they are liable to be damaged by people's feet walking by, besides scratching the edges and distorting the wing, owing to it being improperly supported.

A PARTS ASSEMBLY SHOP.

In all works a shop situated conveniently near to the erecting shop should be provided. This shop we can assume for our purpose to be about 30 ft. square, with two narrow benches along the walls, opposite to each other. About five pairs of trestles, with 3-in. by 2-in. rounded bearers, sufficiently long to support the whole length of the wing, should also be provided.

In this shop, on the walls, a few small bins for holding the external fittings in can be fixed up, and if possible a small electric portable drill for drilling pin-holes. Into this shop all wings, elevators, ailerons, etc., can be brought to have their external fittings put onto them. To many managers this may seem an unnecessary sub-division of the erecting shop duties, but it will be found to save time, decrease wasted room in the erecting shop, specialise labour in their work, facilitate cost-keeping, expedite the erection of complete machines, lessen the labour and supervision of the erecting-shop foreman, centralise responsibility for perfect work, and generally speed up output. So it seems worth while.

THE COMFORT OF WORKERS.

Further, the bulk of the work can be done by one man, assisted by about six intelligent girls, who, if they are at all suitable for the work, easily pick it up in about a fortnight, especially if conditions for work are comfortable. There should be plenty of air, light, and reasonable warmth, which is as necessary for the planes, etc., as the workers.

There are some people who say, "work, and keep yourself warm." This is possible if you are shifting and erecting heavy steelwork, digging a hole with a pick and shovel, or, better still in cold weather, firing a marine boiler; but aeroplane work does not happen to be similar to any of these blood-circulating occupations. In many cases it requires a certain amount of delicacy of touch and care and patience, none of which qualities contribute to warmth.

Therefore, it is as well to give attention to the subjects of air, light, and warmth, as it is quite possible for a large shop full of workers, say a hundred, to spend twenty-five per cent. of their time in thinking how cold it is. To estimate the cost of this occupation, ask them to book a quarter of an hour every hour to this on their time sheets, and then ask the cost office for the account at the end of a week.

The wings, ailerons, tail planes, fins, rudders, etc., can be brought into this assembly shop to have their external fittings attached. The wings, for instance, require their lift plates and eyebolts put on and split pinned, and the spar brackets or other hinges attached. In fact, an immense amount of incidental yet important work can be done here, thus saving a large amount of room required for whole machines.

ERECTING THE MACHINES.

The complete erection of the aeroplane has now to be considered briefly.

We can assume that the fuselage skeleton is complete; this will be put on two trestles in the erecting shop, and the trestles should have some simple form of adjustable head, so that the height of the work on them can be varied. This is essential, especially in this instance, as the under-carriage has to be fitted onto the fuselage, and it is handy to be able to raise or lower the fuselage without having to look for a few pieces of loose wood. These do not invariably form a solid packing for the fuselage such as is required to enable the fuselage to be held in a horizontal position.

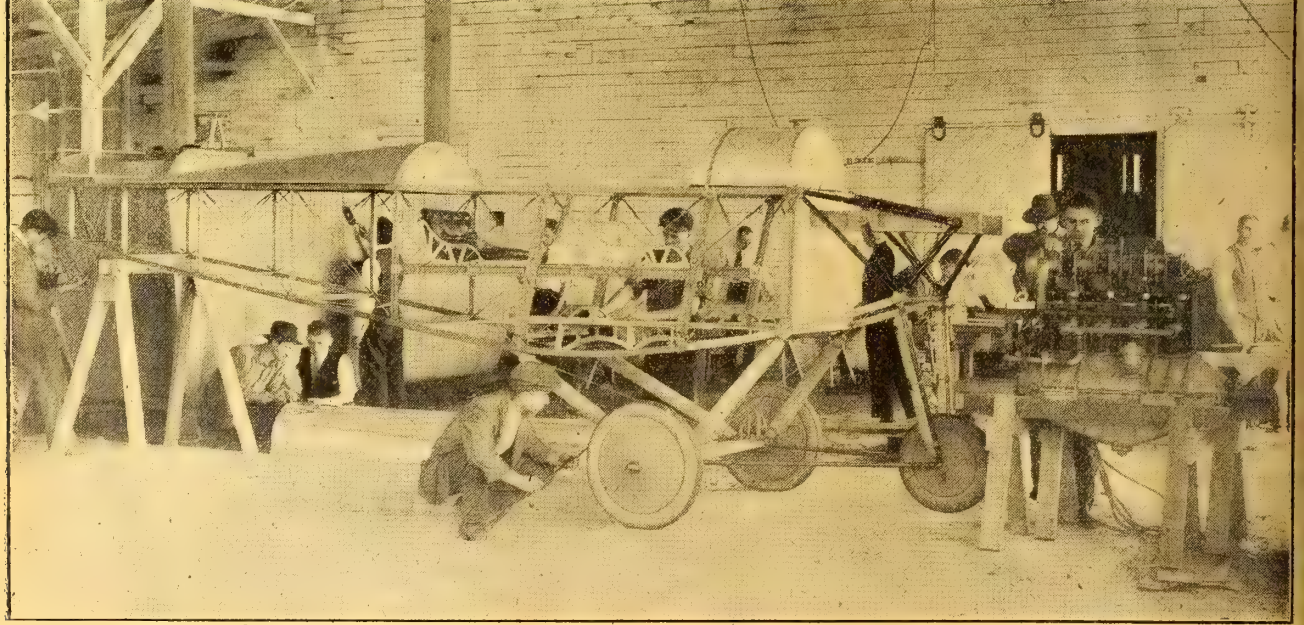
ACCESSORIES IN THE ERECTING SHOP.

The under-carriage having been attached to the fuselage and all the bolts put in and split-pinned up, the axle can be put into its position. The shock-absorbers can be then wound on and the aluminium streamline fairing attached. It will not be advisable to put on the wheels until the machine is practically finished, as the tyres deteriorate, the covers get dirty and frequently torn, and everybody makes footsteps of them. Therefore, a pair of small wooden Vee trestles should be made, into which the bearing-ends of the axle can rest.

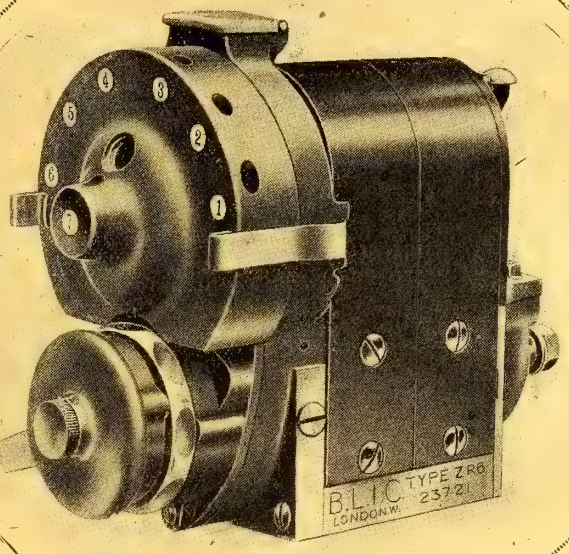
As a considerable amount of work will have to be done which involves the workers being about eighteen inches above the floor level, it would save a considerable amount of waste of time and litter of old boxes kicking about the shop if a few 6 to 8-ft. forms are made for the workers to stand on.

PRELIMINARY FITTING.

The next thing to do will be to fix in the tank bearers and



IN AN AMERICAN AIRCRAFT FACTORY.—The Lawson Aircraft Corporation's Assembling Shop. The fuselage stands on concrete T, presumably for purposes of levelling, and the various other components, such as wings and engine, are evidently assembled in its immediate vicinity. The shop appears to have a "dirt" floor, which will probably create dust.



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prepare for the reception of the tanks for the petrol and oil supply. As soon as these are fitted, it will be as well to put in the instrument board so that instruments can be set out in their respective positions and screwed into their positions after any necessary cutting and fitting has been done.

As soon as they are in position the coppersmiths should be detailed off to fit in the copper pipes and bends from the instruments to the tanks, at the same time the installation of the controls can be commenced, the rudder-bar being fixed in position, and the "joy-stick," or control pillar, for working the aileron and elevator controls.

Having put these in, the streamline fairing on the fuselage can be fitted. In some machines this is an independent unit in one piece, in others, it is built up on the fuselage in skeleton form and covered with fabric, which is afterwards doped and varnished. Also, the fuselage will be covered round with fabric, which is stretched on and tacked to the longerons, and the tacks finished off or covered over with a small half-round beading.

Fixing the Tail.

The tail plane can next be attached to the fuselage, but before being finally fixed in position it must be tested to see that it is fairly and squarely at right-angles to the longitudinal centre-line of the machine. This can be done with long trammel points or a steel tape, and measuring from the left and right-hand tips of the tail plane to a fixed point on the centre-line of the fuselage; this must be dead right and an equal measurement on either side. Differences, however small, cannot be permitted, and all necessary alterations must be made until the dimensions are accurate.

Engine Fitting.

For the moment, as most work is being done at the tail-end of the machine, it may be considered a suitable time to lift the engine into position, but before lifting it in it is necessary to secure the tail of the machine in some way to the floor, either with ropes fastened to temporary cleats screwed to the floor, or some heavy weight. Unless this is done the machine will tilt up when the engine is installed, as the weight of the engine is considerable.

It is not advisable to expect the engine erectors, either with or without help, to lift the engine into position. The lifting should be done with a half-ton worm-geared chain tackle, and some good, reliable 1½-in. rope, and a couple of stiff bird-mouthed bits of wood to put between the rope slings to prevent them from bending or breaking various parts of the engine or chafing or cutting themselves. Also, incidentally, it is advisable to attach the tackle to something which is capable of standing at least double the weight of the engine. Gas pipes and electric conduits, or coat-hooks, should be considered out of bounds, and may be neglected as anchorage for the lifting tackle.

(To be continued.)

ALLOWANCES FOR BENDING SHEET METAL.

By RANDOLPH F. HALL.

Of the Thomas-Morse Aircraft Corp.

It is an important point in the design of fittings to make correct allowances for bends in sheet metal. The writer, together with B. D. Thomas, has carried out a number of measurements on bends round a 1 in. square bar, and the results are embodied in the chart of Fig. 1, on lengths measured along the neutral axis.

A number of strips, 18, 16, 14, and 12 gauge sheet-steel, were bent over a 1 in. square steel bar, with corners rounded in each case with the radius equal to the thickness of the metal. Had no allowance been required for bending, the ends of the strip

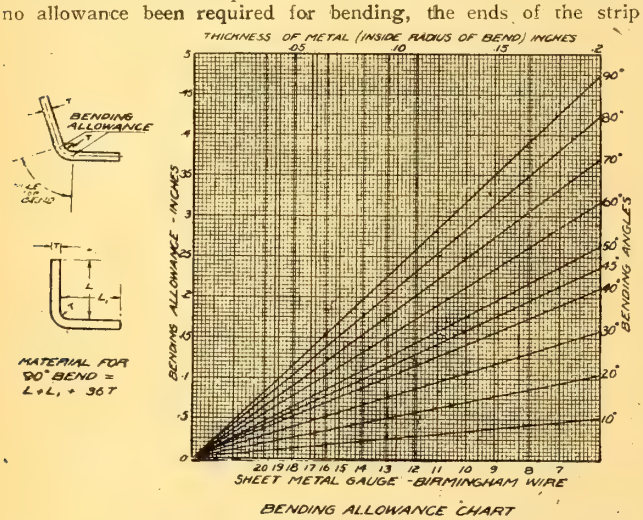


Fig. 1

would have met in the centre of a face of the bar, but instead a gap resulted, which divided by four gave actual allowance for one bend. The allowances required per bend were between thirty-three hundredths and thirty-eight hundredths times the thickness of the metal, and the mean of ten different tests confirmed the allowances computed on the neutral axis. From these experiments the curves of Fig. 1 were deduced, allowances for angles less than 90 deg. being made proportionately.

Results in the factory verify the chart. If the corners are hammered flat, less allowance is required, but the fitting is weakened.

AUSTIN AMBULANCE STATIONS.

From the Austin "Advocate":—

Accidents are unavoidable in any works; the present high pressure tending to greater frequency, but, fortunately, the cases are mostly minor. If the output is to be kept at the required level, the health of the worker must be cared for. Hence all ailments and accidents must have instant and satisfactory treatment. To ensure this attention Ambulance Stations, having separate rooms for men and women, are provided. They are adequately fitted with the necessities for the work carried on: there is in each section a rest room, with couch, etc., where a worker may remain in quietness for a period of recuperation. Its obvious advantages were prominently brought to the writer's notice recently in the case of a girl subjected to heart attacks. One such seizure had overtaken her on the day in question, and recovery was greatly assisted by the accommodation available. Without it, she would have had to go home, and the whole day's work would have been lost.

All the other requirements for an up-to-date Ambulance Station are here, such as electric sterilisers, medicine cabinets, stretchers and emergency first-aid boxes. These latter being fitted with every requisite for rendering first-aid are indispensable in the event of a serious case which it is inadvisable to move at once to the dressing station.

Properly qualified nurses, male and female, are on duty both day and night and are kept fully occupied. It would seem that bruises and ailments run in epidemics: one day there is a run on cut fingers, the next on toothache, and so on. Rarely is the station without a patient, and, apart from the practical work to be done, there is a certain amount of clerical work, as a record of all accidents and their treatment has to be kept.

The stations are periodically inspected by a local physician, who advises as to the best means of treating cases, the proper material and apparatus to use, and so on. If a very serious accident happens, the unfortunate person is sent to hospital with the greatest possible speed, there being an excellent motor-ambulance service, set aside exclusively for that purpose.

A very noticeable feature of this section of women's war work is the enthusiasm of the nurses—keenness being the keynote of it all. "I think ambulance work is fine: I could bandage all day without being tired," said one very busy worker, and she continued, "We profess to cure every ache except heartache, and the other day we even cured that with a dose of 'Sal-volatile' "—so much for "*la grande passion.*"

These scraps of conversation serve to show that those essential characteristics of a nurse, cheerfulness and a ready sense of humour, are so much in evidence even under the stress of their duties, and it is a gratifying feature to find that an Ambulance Station is one of the pleasantest and brightest, although, unfortunately, one of the very busy departments in the works.—(Miss) A. McG.

WAR WORK FOR WOMEN.

In addition to the 10,000 women which the War Office notified to the Employment Department as being required by the end of October, large numbers are wanted for work under the Royal Flying Corps. These women will be required to work in the aircraft repairing depots, both at home and in France. The numbers notified as being wanted immediately by the Royal Flying Corps are: 144 fitters (general machine and turners), 52 instrument repairers, 20 acetylene welders, 37 electricians, 12 draughtswomen, 55 painters, 2 tracers, 145 storekeepers (Class I.) (these women are required for technical stores, and should have a knowledge of engine parts and tools), 503 sail-makers for work of making and repairing aeroplane wings (for this purpose good needlewomen who can also use sewing machines are wanted). In addition tinsmiths, coppersmiths, and tender drivers are wanted. All applications should be made to the Employment Exchanges, where full information will be supplied.

AERONAUTICAL RESEARCH.

The Industrial Research Committee of the Board of Education have made a grant to Professor G. H. Bryan, F.R.S., of the University College of North Wales, which will enable him to devote the whole of the next session to the carrying on of aeronautical research of national importance. In the first instance Professor Bryan proposes to carry out the work at the University of Bristol.

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MARKET REPORTS.

Prices given are for quantities on usual terms.

Oct. 11th, 1917.

COPPER.—It is reported that the U.S. Government intend exercising a very strict control on Copper by prohibiting supplies for any purpose other than the fulfilling of orders of national importance. In view of the threatened shortage of this metal, the step is certainly justified, and should be welcomed by the Allies. There is a slight improvement in output, but nothing worth speaking about, and there does not appear to be any indication of the labour troubles being settled.

Since the last report Copper Sheets have been reduced £4, and B.S. £5; it will also be observed, upon reference to the Prices Current List, that the recent reductions in Copper prices have naturally affected the prices of Copper and Brass Scrap.

Comparative Prices.

To-day	£110	0	0	per ton.
Last Month	120	0	0	per ton.
Last Year	120	10	0	per ton.
Average, 1916	116	1	3	per ton.

TIN.—The Tin market appears to have been a little steadier recently; this may be due to the large shipments which have recently been received, and further quantities being on the way.

A very fair business has recently been done, although there appears to be a reluctance to sell material forward.

Comparative Prices.

To-day	£244	10	0	per ton.
October 8th	£244	10	0	per ton.
October 4th	245	10	0	per ton.
October 1st	243	10	0	per ton.
Last Month	241	0	0	per ton.
1916	177	0	0	per ton.
Highest Price, 1916	205	0	0	per ton.

LEAD.—Official prices remain unaltered and supplies are being well maintained; the demand, however, is continually increasing and a very strict control is being exercised, so that it is impossible to obtain supplies for domestic purposes.

STEEL.—It is still doubtful whether orders for Steel will be placed with America. There is a margin between prices prevailing here and U.S.A. prices; at the same time there does not appear to be any reason why contracts should not be fixed up, if there is a possibility of the works giving delivery in addition to the U.S. Government contracts.

The demand here for all classes of Steel is reaching a colossal figure and manufacturers are finding it impossible to cope with the demands made upon them; as stated in previous reports, tremendous efforts are being made to effect substantial increases in the output; nevertheless, consumers are apparently booking their requirements well ahead, and, in view of the prevailing difficulties, this is certainly the wisest step to take. The Air Board are steadily increasing the output of Aircraft Steels, and supplies are fairly satisfactory.

There is still an acute shortage of H.S. Steel, and it is now becoming increasingly difficult to obtain Cast Steel. Supplies of Sheet Steel are not as easy to obtain as they were a few months ago. One presumes the Air Board are not losing sight of the fact that the demand for this material is increasing proportionately with other Aircraft Steels and are accordingly arranging for the output to be increased considerably.

TIMBER.—Supplies of Silver Spruce are still very scarce although one or two shipments are occasionally received. There is an apparent rush to book contracts for the Silver Spruce substitutes; official instructions do not, however, appear to have been issued; furthermore, it is more than likely that the Air Board will buy the quantities required by the whole of the factories and instruct contractors to apply to them for supplies, notwithstanding the "Silver Spruce Muddle"; however, they have probably learned a valuable lesson.

It is still difficult to obtain substantial supplies of Walnut and Mahogany, and the requisitioning of all stocks of the latter by the Timber Controller was certainly a wise step.

FABRIC.—It is very difficult to see what will be done if the authorities do not settle the Irish strike very quickly. The delay does not improve the situation.

CURRENT MARKET PRICES.

Oct. 4th, 1917.

The prices given below are the prices ruling on the above date.

TERMS.—Usual for the various materials mentioned.

Prices of old metals are as quoted by scrap dealers.

Prices must not be taken as specific quotations for definite quantities delivered to any part of the country.

ALUMINIUM.

Ingot	£225 per ton.*
Remelted	£210 per ton.*

BRASS.

Sheets	15⅝d. per lb.
Strip	14⅛d. per lb.
Wire	14½d. per lb.
Tubes	15¾d. per lb.
Castings	15d. per lb.
Turning Rod	14¼d. per lb.
Brazed Tubes	19¾d. per lb.

COPPER.

Ingot, Standard, Cash	£110 per ton.
Ingot, Standard, 3 mos.	£110 per ton.
Best Selected (Nett)	£123 to £119 per ton.
Sheets	£151 per ton.
Wire	16¼d. per lb.
Tubes, S.D.	18½d. per lb
Tubes, Brazed	18½d. per lb.
Rivets	1s. 11½d. per lb., basis.
Tacks	1s. 11d. per lb.

FABRIC.

Linen, R.A.F., 17C, Spec., 36 in. wide,	2s. 8d. p. yd.*
Linen, R.A.F., 17C, Spec., 38 in. wide,	2s. 9½d. p. yd.*
Spaced, R.A.F., 17C, Spec., 37½ in. wide,	1s. 9d. p. yd.*

GUN METAL.

Castings	1s. 8d. per lb.

LEAD.

Virgin Pig	£29 per ton, c.i.f.*
Virgin Pig	£30 per ton, ex stores.
Sheets	£39 10s. per ton, D/D.
Pipes	£40 per ton.
Dry White	£46 10s. per ton. less 5 per cent.
White in Oil	£53 per ton. (lots over 5 cwt. less 5 per. cent.)
White in Oil	£55 per ton. (lots under 5 cwt. less 5 per cent.)
Red	£42 per ton, less 2½ per cent.

NICKEL.

Nickel	(Home) £200 per ton.

PHOSPHOR BRONZE.

Ingots, 5 cwts, and under	£159 to £187 per ton. (Subject to Copper and Tin Fluctuations.)
Castings	1s. 7d. to 1s. 11d. per lb.

PHOSPHOR COPPER.

Ton lots	£200 to £205 per ton.

SILVER.

Silver	45¾ per oz.

SOLDER.

Plumber's	103s.
Tinman's	135s.

STEEL.

High Speed, 14 p. cent., Tungsten,	2s. 10d. per lb., basis*
High Speed, 18 per cent., Tungsten,	3s. 10d. per lb., basis.*

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Round and Square :—

Specification No. S2	£86
Specification No. S2 (bright-drawn)	£115
Specification No. S8	£86
Specification No. S10	£70
Specification No. S12	£75
Specification No. S14	£43
Specification No. S15	£70
Specification No. S16	£70
Specification No. S17	£75
Specification No. S18 (oil-hardened)	£86
Specification No. K1	£75
Specification No. K2	£75
Specification No. K3	£86

The above prices are for ¼ in. to 5/16 in. only, other sizes are proportionate.

Hexagons	.455 and .525	.601 and .710
Specification S2	£79	£77
Specification S8	£79	£77
Specification S2 (bright-drawn),	£112	£112
Specification S8 (bright-drawn),	£112	£112

SPELTER.

English f.o.b., Birmingham	£57*

TIN.

Tin	£244 10s.

TINPLATES.

Tinplate	30s., basis, f.o.t.

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	Official.	Merchants.
Silver Spruce, 10s. 4d.		17s. 9d., c.f.†
English Ash		13s. 6d., c.f.†
Mahogany, 1s. 6d. to 1s. 10d.	2s. 2d. to 2s. 6d., c.f.†	
Walnut, 2s. to 2s. 3d.	2s. 3d. to 2s. 6d., c.f.†	

ZINC.

Zinc Sheets (American)	£100, f.o.b., New York.

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Brass, Heavy Selected	£90
Copper, Clean	£100
Copper, Brazery	£80
Lead, no Draft	£26
Zinc, Old	£40
Gun Metal, Scrap	£120

*Official Prices.

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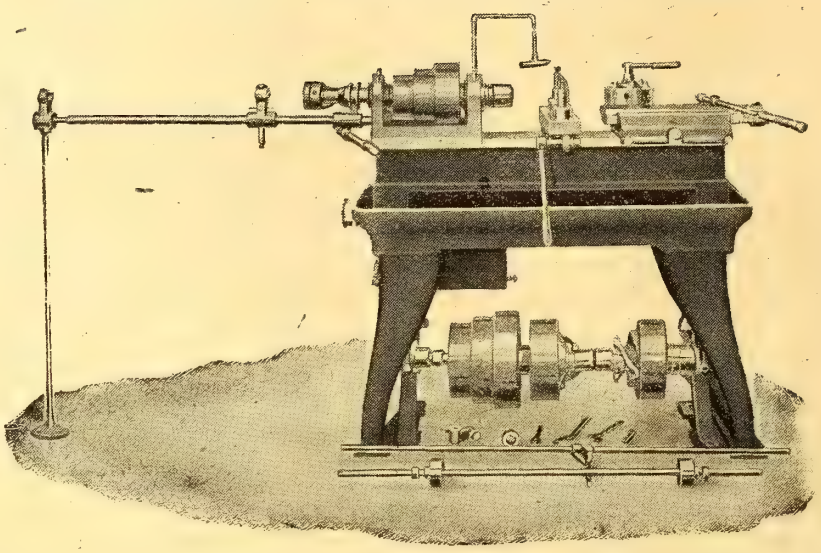
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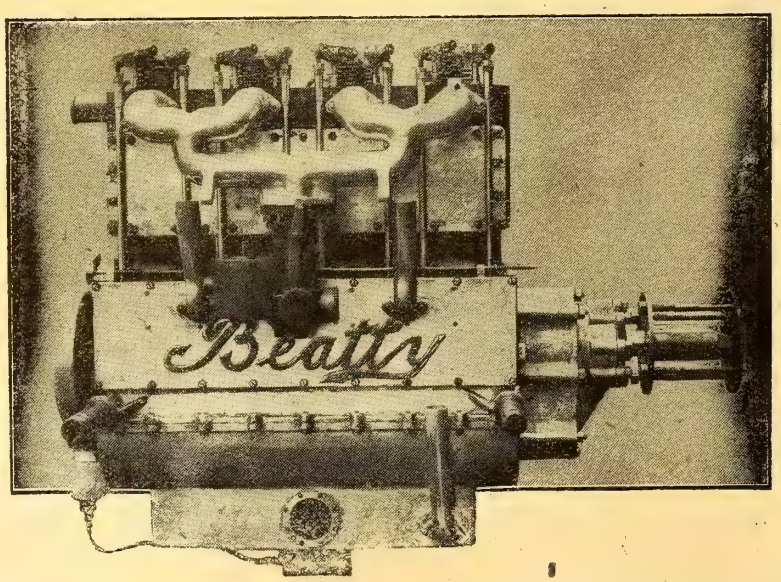
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lasso Manufacturing Co., Ltd., 211, City Road, E.C. City 9558.
ondon Label Co., Ltd., Harley Works, Beckton Road, E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.
MacLennan, J., & Co., 30, Newgate Street, E.C.1., and at Glasgow. Tapes, Cords and Threads. City 3115.

tor Cars—

Arrol Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.
Mann, Egerton & Co., Ltd., 379/381, Euston Road, London, N.W.1. "Manegecar, Euston road, London." Museum 70.
Standard Motor Car Co., Coventry. "Flywheel, Coventry." Coventry 530 (4 lines).

meplates and Labels—

Endolithic Manufacturing Co., Ltd., 61½, Fore Street, London, E.C.2.
The Clegg Metal Engraving Co., Chatsworth Works, Worthing. "Clegg Worthing."

bservation Panels—

Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

rachutes—

E. R. Calthrop's Aerial Patents, Ltd., Eldon Street House, Eldon Street, London, E.C. "Savemalivo, Ave, London." London Wall 3266-3267.

tent Agents—

King's Patent Agency, 165, Queen Victoria Street, E.C.4. Central 682.
Page & Rowlingson, 27, Chancery Lane, E.C.4. Central 332.
Stanley Popplewell & Co., 38, Chancery Lane, W.C.2. Central 1763.

trol Storage (Bulk)—

Bywater & Co. (The Hydraulic System), Craven House, Kingsway, London, W.C.2. "Bywaterist, London." Gerrard 2220.

Piston Rings—

British Chuck & Piston Ring Co., Coventry. "Rings, Coventry." Coventry 723.

Power Presses and Dies—

Bliss, E. W., & Co., 25, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon, London." Hop 4340.

Presswork—

Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851
Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.
Integral Propeller Co., Ltd. "Aviprop, Hyde, London." Hendon 9, Kingsbury 104.
Lang Propeller, Ltd., Weybridge. "Aerosticks, Weybridge." Weybridge 520-521.
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich" Norwich 482 (4 lines).
Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 291, Leeds.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

Rigging for Aircraft—

Cradock, G., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466. Enfield 520 (6 lines).

Safety Belts—

Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.

Sand and Die Castings—

Coan, R. W., 219, Goswell Road, London, E.C. "Krankases, Isling, London." City 3846.

Scientific Instruments—

The Foster Instrument Co., Letchworth, Herts. "Instrument, Leeds." Chapeltown 474.

Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay, 345 (3 lines).
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.
Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton." Southampton 1337.

Seats for Aeroplanes—

Bowser, E., Art Cane Works, 50 Park Lane, Leeds. Central 3437.

Shackles—

The British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow. "Golshel, Hounslow." Hounslow 254.

Sheet Metal Pressings—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.
W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk, Bham." Central 550.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 497 Birmingham.
Nicholls & Lewis, Ltd., 16, Princep Street, Birmingham. "Colpressed, Birmingham." Central 2188.
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

Sheet Metal Work—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.

Shock Absorbers (Elastic Cord)—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough."

Sparking Plugs—

Peterborough 128.
Forward Motor Co., Summer Row, Birmingham. Central 6259.
Hobson Manufacturing Co., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.
Lodge Sparking Plug Co., Ltd., Rugby. "Igniter, Rugby." Rugby 235.
Ripault, Leo, & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758.

Springs—

Dart Spring Co., West Bromwich. "Dart. West Bromwich." West Bromwich 322.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Steel—

Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237.
Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham." Smithwick 224.

Steel Tension Wires—

Cradock, G., & Co., Ltd., Wakefield. "Cradock, Wakefield." Wakefield 466 (3 lines).

Steel Tubes for Aeroplanes—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Taper Pins—

Mountford, Fredk. (Birmingham), Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262.

Tapes and Smallwares—

MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.
James North Hardy & Son, Ltd., 54, Portland Street, Manchester. "Hardson, Manchester." Central 6471.

Timber—

Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Entikosil, Vic, London." Victoria 5073, 4210.
Brown, R. F., & F. W., Wollaton Saw Mills, near Nottingham. "Brown's Saw Mills, Wollaton." Nottingham 1526.
J. Owen & Sons, Ltd., 199a, Borough High Street, S.E.1. "Bucheron, London." Hop 3811 (2 lines).

Time Recorders—

Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310.

Turnbuckles—

Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

Tyres and Wheels—

The Beldam Tyre Co., Ltd., Brentford, Middlesex. "Beldam Tyres, Brentford." Ealing 125-126.
The Palmer Tyre, Ltd., Shaftesbury Avenue. "Tyricord, Weskent." Gerrard 1214 (4 lines).

Varnishes—

Clark, R. Ingham, & Co., Caxton House, S.W.1. "Pearline, Vic, London. Victoria 2923.
Harland, W., & Son, Merton, London, S.W.19. "Harland, Wimbledon 45." Wimbledon 45 and 1395.
Naylor Bros., Ltd., Southall, Middlesex. "Naylor, Southall." Southall 30.

Washers—

Herbert Terry & Sons, Ltd. Redditch. "Springs, Redditch." Redditch 61.

Watchmakers and Jewellers (Silver Models)—

Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 9091 (3 lines).

Welding Repairs—

Barimar, Ltd., 10, Poland Street, W.1. "Barimar, Reg, London." Gerrard 8173.

Wind Shields—

Auster, Ltd., 133, Long Acre, W.C. "Winflector, London." Regent 5910.
London Label Co., Ltd., Hadley Works, Beckton Road, E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Wires and Cables (Aeroplanes)—

Bruntons, Musselburgh, Scotland. "Wiremill, Musselburgh." Musselburgh 28.
Cradock, Geo., & Co., Ltd., Wakefield. "Cradock, Wakefield." Wakefield 466 (3 lines).

Wirework—

Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Woodworking Machinery—

Robinson, Thomas, & Son, Ltd., Railway Works, Rochdale. "Robinson, Rochdale." Rochdale 467.
Sagar, J., & Co., Ltd., Halifax. "Sawtooth, Halifax." Halifax 136.
Wadkin & Co., Leicester. "Woodworker, Leicester." Leicester 1614.

THE AEROPLAN

Acetylene Welding Plant—
Imperial Light, Ltd., 123, Victoria St., S.W. "Editeas, Phone, London." Victoria 3540.

Aeroplane Manufacturers—
Aircraft Manufacturing Co., Ltd., Hendon. "Airmanship, Hyde, London." Kingsbury 180.
Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne." Gosforth 500.
Blackburn Aeroplane & Motor Co., Olympia, Leeds "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.
British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol" Bristol 3006.
British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudroplan, Crickle, London." Hampstead 5551.
Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6. Hampstead 4728.
Davidson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1144-1145
Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1176.
Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 120.
Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophid, Crickle, London." Hampstead 7420.
Mann, Egerton & Co., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
Martinsyde, Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge." Woking 331; Byfleet 171.
National Aircraft Co., Ltd., 15, Hackney Road, N.E.2. London Wall 6725.
"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London." Willesden 2455.
Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48.
The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis, London." Putney 2240-2241.
Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester." City 8530-8531, Manchester.
Sage, Frederick & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes." Cowes 193.
Short Bros., Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London." Regent 378.
Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston." Kingston 744.
Standard Aircraft Manufacturing Co., Effingham House, Arundel Street, W.C.2. "Gunsignrush, Estrand, London." City 89.
Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickerfyte, Knights, London." Kensington 6810.
Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil" Yeovil 129.
White, J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes." Cowes 3.

Airships—
Airships, Ltd., High Street, Merton. Wimbledon 1314.
Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, Phone, London." Regent 378.

Aluminium Castings—
Coan, R. W., 219, Goswell Road, London, E.C.1 "Krankases, Isling, London." City 7846.

Aluminium Presswork (Stampings, Etc.)—
Willans & Robinson, Ltd., Victoria Works, Rugby. "Willans, Rugby." Rugby 112 (3 lines).

Bearings (Etonia Cast Phosphor Bronze)—
Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3927.

Brass Sheets for Tipping Propellers—
Lucraft, H., & Co., 147, Fenchurch Street, London, E.C.3. "Lucraftia, London." Avenue 2217.
Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 995, 996, and 7006.

Buildings—
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.
Fairby Construction Co., Ltd., 117, Victoria Street, S.W.1. "Bizbifold, London." Victoria 8868.
Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313
Ruberv Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
The Wilbey Co., Ltd., Salisbury House, London Wall, E.C.2. "Wrathless, Phone, London." City 2681-2

Cable Coverings and Cable Controls—
Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Capstan Work—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Carburettors—
Hobson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.

Castings—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Lucraft, H., & Co., 147, Fenchurch Street, London, E.C.3. "Lucraftia, London." Avenue 2217.

Castings (Aluminium, Brass, Bronze, Machined or Rough)—
Coan, R. W., 219, Goswell Road, London, E.C.1. "Krankases, Isling, London." City 7846.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Willans & Robinson, Ltd., Victoria Works, Rugby. "Willans, Rugby." Rugby 112 (3 lines).

Cellon—
Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawb, London." London Wall 5359-3622.

Celluloid (Non-Flam.)—
Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7.
London Label Co., Beckton Road, E.16. "Lonlabel, Canning, London." East 1300.

Clothing—
Burberry's, Ltd., Haymarket, S.W.1. Regent 2165.
Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6.
Hazel & Co., 4, Princes Street, Hanover Square, W.1. "Hazelco, London." Mayfair 4071-2.
Robinson & Cleaver, Ltd., Regent Street, London, W.1. Gerrard 1070.

Component Parts—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (4 lines).
B. D. V. Aircraft Spares, Syon Chambers, 161, Kew Road, Richmond, Surrey. "Aeros, Richmond." Richmond 1681.
Central Aircraft Co., Palmerston Works, High Rd., Kilburn, N.W.6. Hampstead 4728.
The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aerocranes, Canning, London."
The Osborne Aircraft Co., Ltd., Whin Hill, Greenock, Scotland. "Cordage, Greenock." Greenock 618.

Cords, Tapes, and Threads—
MacLennan, J., & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.

Dopes—
British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Teirafree, Piccy, London." Gerrard 2312.
British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellulate, London." Regent 4046.
Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawb, London." London Wall 5359-3622.
Clark, Robert, Ingham & Co., Ltd., Caxton House, S.W.1. "Pearline, Vic, London." Victoria 2923.

Electrical Accessories—
Mann, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston road, London." Museum 70.
Premier Electric Heaters, Ltd., 258, 259, and 300, Bradford Street, Birmingham. "Fahrenheit, Birmingham." Midland 981.

Electric Cables—
E. Kalker & Co., Coventry. "Kalker, Coventry." Coventry 24x.

Electric Lighting and Power—
E. Stanley Fardon, A.M.I.E.E., 67, Mosley Street, Manchester.

Engines and Parts—
Allen, W. H., Son & Co., Ltd., Queensbury Engineering Works, Bedford. "Allen, Bedford."
Arrol-Johnston, Ltd., Dumfries, Scotland. "Arrol, Dumfries."
The Beauty School of Flying Ltd., Dumfries, Broadway, Cricklewood, N.W.2. "Hamworthy."
Beardmore Aero Eng., Ltd., 111, Gower Street, W.C. "Beardmore, London."
Dudbridge Iron Works, Ltd., Gerrard Victoria Street, London S.W.1.
Gordon Walney & Co., Ltd., Weybridge. "Mercedès, Weybridge." Weybridge 259 (3 lines).
Green Engine Co., Ltd., Tinsley, Sheffield. Richmond
Gwynnes, Ltd., Hammersmith Engineers, Hammersmith, W. "Gwynnes, Hammersmith."
Rolls-Royce, Ltd., 13 and 15, Conduit Street, "Rolhead, London." Gerrard 4600.
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent
Sturtevant, B. F., Co., Ltd., Hyde Park, London, U.S.A.
Sunbeam Motor Car Co., Ltd., Wolverhampton. "Moorfield, Wolverhampton." Wolverhampton
The Gnôme & Le Rhône Engine Co., 47, Victoria Street, S.W. "Engine, London." Walthamstow 968
Willans & Robinson, Ltd., Victoria Works, Rugby. "Willans, Rugby." Rugby 112 (3 lines).

Flexible Shafts—
Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch."

Flying Schools—
Bournemouth Aviation Co., Ltd., Tillage, Bournemouth. "Erches, Bournemouth."
Cambridge School of Flying, Aeronautics Ltd., 30b, St. Andrews Street, Cambridge.

Furniture (Office)—
Cooke's (Finsbury), Ltd., Finsbury Pavement House, London, E.C.2. London Wall 577 and 2

Galvanising—
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich
Cowper-Coles Manufacturing Co., Cranford, Thames.

Gears—
Moss Gear Co., Ltd., Thomas Street, Birmingham. "Mosgear, Birmingham."

Glue—
Improved Liquid Glues Co., Ltd., Cottage Street, E. (Croid). "Croid, London."
Mendine Co., 8, Arthur Street, E.C.

Goggles—
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London."

Heating and Ventilating—
Comyn, Ching & Co., Ltd., Castle Street, Acre, W.C. "Comyn, Ching, London." Gerrard 167
Chas. P. Kinnell & Co., Ltd., 93, Southwark Street, London, S.E.1. "Kinnell, London." Hop 372

Instruments—
British Wright Co., Ltd., 33, Charing Cross, W.C.2. Holborn

Instruments (Scientific, meters, etc.)—
Short & Mason, Ltd., Mapleton Road, Walthamstow, E.17. "Aerocil, Walthamstow, London."

Machine Tools—
Brewster & Co., 11, Queen Victoria Street, E.C 4. "Circumfuse, Cannon, London."

Magneto Driving Pieces—
Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch."

Magnetos—
The M-L Magneto Syndicate, Ltd., Magneto Works, Coventry. "Cortion, Coventry."
The British Lighting & Ignition Co., Ltd., 204, Tottenham Court Road, W. "Lumag, Phone, London."

Metal Manufacturers—
Clifford, Chas., & Sons, Ltd., Birmingham. "Clifford, Birmingham."

Metals in General—
Samuel Mercer & Co., 198, Upper Thames Street, E.C.4. "Reconciled, London."
Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 995, 996

BUYERS' GUIDE.

Metal Parts and Fittings—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
Aircraft Supplies Co., Ltd., 325, Long Acre, W.C.2. "Upcast, Rand, London." Gerrard 276.
Arrol & Harrison, Ltd., Hythe Road, Willesden Junction. Willesden 2207.
Bayliss, Jones & Bayliss, Ltd., Wolverhampton. (Bolts and Nuts.) "Bayliss, Wolverhampton." Wolverhampton 1041.
The Birmingham Guild, Ltd., 45a, Gt. Charles Street, Birmingham. "Handicraft." Central 3705.
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
The British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow, London. "Golshel, Hounslow." Hounslow 254.
Mann, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston road, London." Museum 70.
Mountford, Fredk., Ltd., Fremo Works, Lifford, Birmingham "Fremo, Birmingham." Kings Norton 261.
Rubery, Owen, & Co., Ltd., Darlaston. "Roofs, Darlaston." Darlaston 87.
Sankey, Joseph, & Sons, Ltd., Wellington, Shropshire. "Sankey, Wellington, Salop." Wellington 66.
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.
The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aerocranes, Canning, London." East 1300.
Thompson Bros., Ltd., Bradley, Bilston. "Thomson Bros., Bilston." Bilston 10.
Wooler Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10.

Metal Shearing Tools—
Montgomery, Smith, & Co., Ltd., Tangent Works, Keynsham, near Bristol. "Ingenuity, Salford." Keynsham 21.

Metal Spinnings—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Metric Bolts—
Eadmore Bros., Zeta Works, Hildreth Street, Balham, S.W. Battersea 415.
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

Miscellaneous—
Anderson, D., & Son, Ltd. (Roofs), Belfast. "Anderson, Belfast" Belfast 4033-4034-4035.
Anti-Glare Glass Co., Ltd., 76, Turnmill Street, E.C. Central 3731.
Bowden Wire, Ltd., Willesden Junction, "Bowirelim, Harles, London." Willesden 2400 (3 lines).
Brown Bros., Ltd., Great Eastern Street, E.C.1. "Imbrowned, Bethroad, London." London Wall 6100.
Eddelblue Manufacturing Co., Ltd., 613, Fore Street, London, E.C.2. Labels in Metal, Ivory, Ivorine, etc.
Herbert Frood Co., Ltd., Chapel-on-le-Frith. "Frodobrake, Birmingham." Central 793.
Glaston Manufacturing Co., Ltd., 211, City Road, E.C. City 9558.
London Label Co., Ltd., Harley Works, Beckton Road E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London."
MacLennan, J., & Co., 30, Newgate Street, E.C.1, and at Glasgow. Tapes, Cords and Threads. City 3115.

Motor Cars—
Arrol Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.
Mann, Egerton & Co., Ltd., 379/381, Euston Road, London, N.W.1. "Manegocar, Euston road, London." Museum 70.
Standard Motor Car Co., Coventry. "Flywheel, Coventry." Coventry 530 (4 lines).

Nameplates and Labels—
Eddelblue Manufacturing Co., Ltd., 613, Fore Street, London, E.C.2.
The Clegg Metal Engraving Co., Chatsworth Works, Worthing. "Clegg Worthing."

Observation Panels—
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Parachutes—
E. R. Calthrop's Aerial Patents, Ltd., Eldon Street House, Eldon Street, London, E.C. "Savemalivo, Ave, London." London Wall 3266-3267.

Patent Agents—
Kings Patent Agency, 165, Queen Victoria Street, E.C.4. Central 682.
Page & Rowling-son, 27, Chancery Lane, E.C.4. Central 332.
Stanley Popplewell & Co., 38, Chancery Lane, W.C.2. Central 1763.

Petrol Storage (Bulk)—
Brewster & Co. (The Hydraulic System), Craven House, Kingsway, London, W.C.2. "Brywaterist, London." Gerrard 2229.

Piston Rings—
British Chuck & Piston Ring Co., Coventry. "Rings, Coventry." Coventry 723.

Power Presses and Dies—
Bliss, E. W., & Co., 29, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon, London." Hop 4340.

Presswork—
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
Terry Herbert & Sons, Ltd., Redditch, "Springs, Redditch." Redditch 61.

Propellers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851
Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.
Integral Propeller Co., Ltd. "Aviprop, Hyde, London." Hendon 9. Kingsbury 104.
Lang Propeller, Ltd., Weybridge. "Aerosticks, Weybridge" Weybridge 520-521.
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich" Norwich 482 (4 lines).
Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 291, Leeds.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

Rigging for Aircraft—
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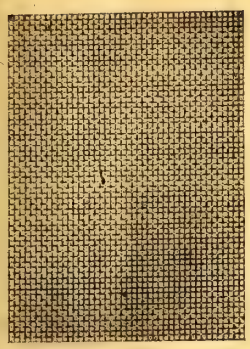
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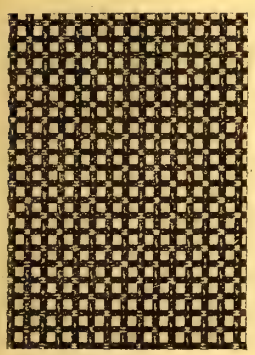
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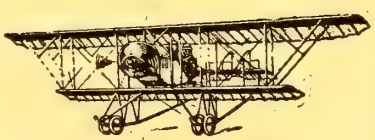
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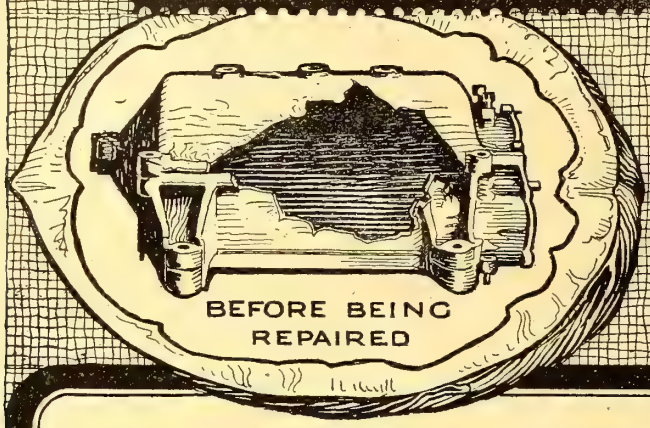
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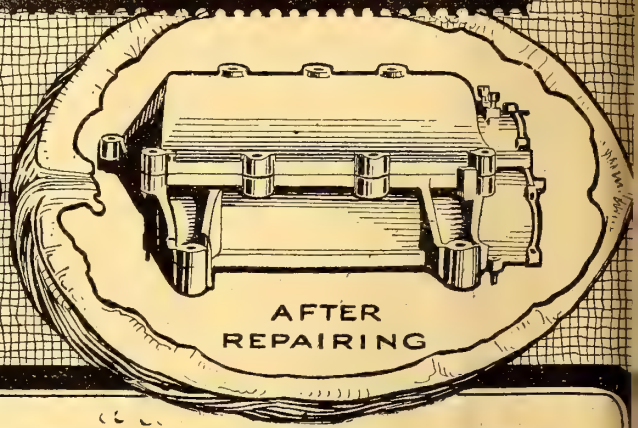
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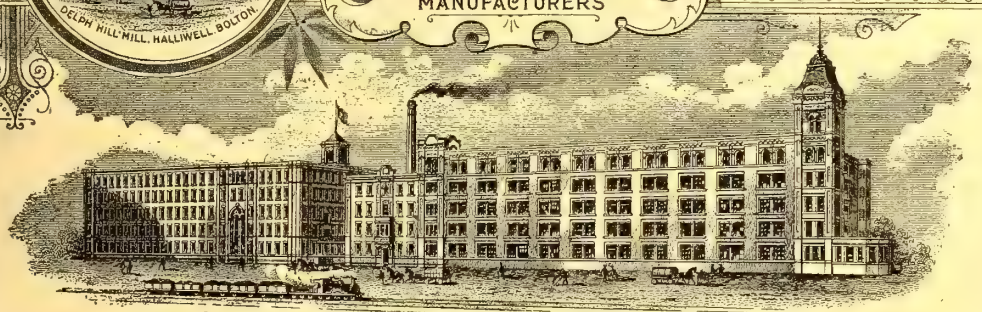
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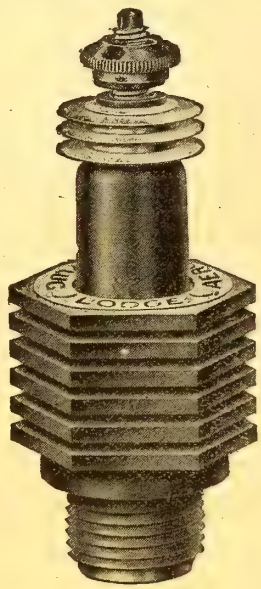
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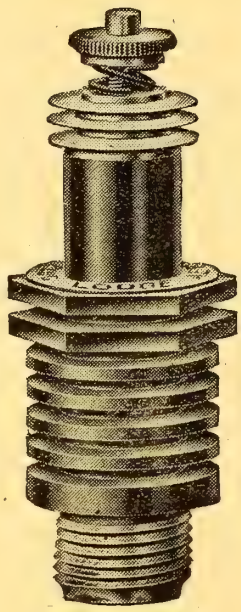
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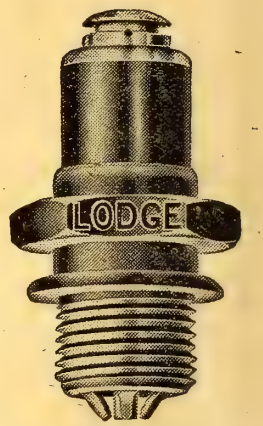
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AUTOGENOUS WELDING (Continued).

An Old Principle Reversed.

Let us now see exactly how these briefly-stated but far-reaching results were obtained by the then new oxy-hydrogen apparatus. The fact was evident enough that the molecules of oxygen and carbon-free combustible gas, completely mingled, duly arrived at the nozzle, in the very flame-pip itself, in the desired proportion and ready for complete mutual combustion.

But how was an immediate explosion of such a detonative mixture avoided? Simply by doing what no one had hitherto thought of—physical results again—giving it a velocity greater than that of the propagation of the flame. In other words, crowding the supply volume wholly out of proportion to its capacity to escape from the jet.

It is distinctly the French and not the English way to examine the visitations of Providence to see whether they can be usefully employed, instead of merely bewailing them. So, although the French commission on fire-damp really discovered nothing more than had been established years before, by the invention of the Davy lamp, they went into the phenomena involved in a more mathematical fashion, and not only affirmed the fact that a detonative mixture if enclosed in a tube—the converse of the Davy-lamp principle—does not take fire instantly throughout its mass, but found that if it be lit at one extremity of the tube, the flame progresses in the tube with a speed increasing as the square of the section of that tube. If, then, the gaseous mass is driven in the opposite direction—that is, towards the point of ignition—at a greater speed than that of the flame propagation—easily calculable beforehand according to the tube-diameter—the flame cannot enter the tube.

Thus the application of this principle to the blowpipe was the simplest affair. It only needed someone to think of it.

However, the granting of patents in all countries to the Société Oxyhydrique showed that the most stringent examination—in some of them at least—established the novelty of this simple thing as embodied in the said blowpipe. Since which, year after year of successful use without a single accident recorded, confirmed its practical qualities of safety; homogeneity of the flame, and easy regulation. Altogether the light, simple and economical blowpipe—in its three types designed for the different kinds of metal according to their greater or less fusibility—which the Society were thus enabled to offer to general manufacturers, boiler-makers, founders, etc., got at a stroke as near perfection as one could reasonably wish.

The Defect and the Remedy.

But as introduced at first, when its use became from then extended to the welding of greater thicknesses of sheet metal, the employment of blowpipes with the larger nozzles required gave trouble. For instance, it frequently occurred in practice—chiefly when using a strong supply of gas, that some accidental happening checked its velocity. Most frequently, if the workman brought the blowpipe nozzle too near the weld in progress; or if he trod on one of the rubber pipes, or if the regulator did not work quite right—then the flame-speed at once became greater than the gas current, and a blow-back occurred. Under the old system one was obliged to drop everything and cut off the supply to avoid melting the blowpipe forthwith, or at least charring the tubes to destruction.

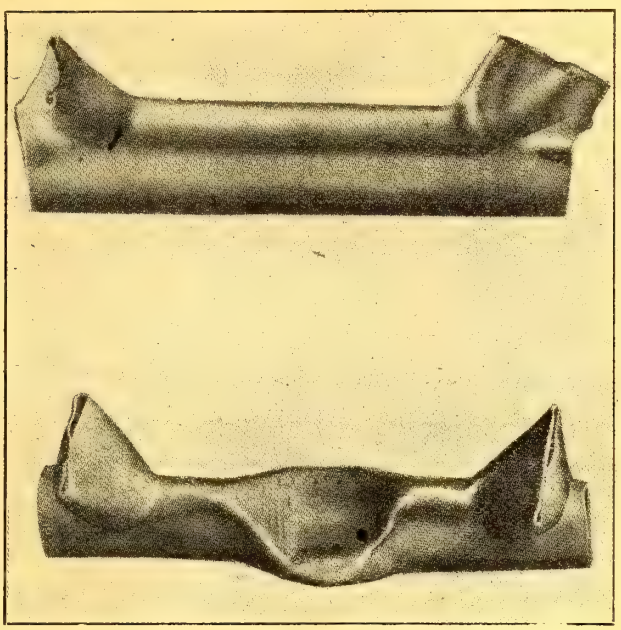
For this reason, the safety mixer was invented. This consisted simply of a funnel-like chamber, fitted at one end with a Y-shaped double tube, one arm for the hydrogen and the other for the oxygen supply pipes, while the other end of the tube, tapered to take a delivery pipe, connected up with a single rubber lead to the blowpipe. Actually, this same thing was modified to form blowpipe and mixer combined, for the Nos. 1 and 2 types, for lighter work.

With this new device, however, if a back-fire occurred in the blowpipe—as will happen—no harm resulted. Combustion stopped instantly, the jet automatically extinguished, and then it was sufficient for the gas-flow to continue as before for the jet to relight as automatically as it went out, from the mere heat of the weld. Altogether the blow-out lasted less than two seconds, not even interrupting the progress of the weld.

Also, not only did the elimination of one of the rubber tubes make the handling of the blowpipe more convenient, but the mixture of the gases was more thoroughly effected and the consumption was notably reduced. So that the employment of oxy-hydrogenous welding at once became practicable for many sorts of work for which it had hitherto been over-difficult.

Various Types of the Blowpipe.

Still, the combination type with its two-way supply had its uses for low-temperature work, as, for instance, the making of seams and joints in lead, brazing copper or brass, or light mendings of any kind. For then one could—and it is the better way—substitute ordinary town-gas for the hydrogen. This latter being, however, usually supplied at a light pressure, in this type of blowpipe the oxygen pressure is made to inspire the town-gas at a greater velocity; practically to suck it in at its own speed.



Showing how a good Autogenous Weld holds together.

This type of blowpipe is simply the mixer, tapered more sharply, and curved at the small end, so as to take any one of the brass nozzles usually supplied. It contains no baffle or gauze funnels, or any other appliance such as is found in other blowpipes, all of which, for that reason alone, are mostly dangerous, or at least inefficient.

The No. 2 type is practically the same, but is designed for any work requiring a temperature only slightly higher than that of the hydrogen flame. It merely contains, however, to regulate the hydrogen supply, a little balance valve, actuated by the oxygen pressure.

No. 3, on the other hand, is the general purpose type with the single delivery tube to the blowpipe itself.

The rest of the apparatus for the complete portable outfit requires little description. Each container—which should be painted white for oxygen, red for hydrogen—has two dials, one a manometer to show the pressure existing in the container at any given moment—and thus the amount of gas remaining—while the other is the indicator, showing the rate of supply in litres per minute: and thus acts as a regulator indirectly.

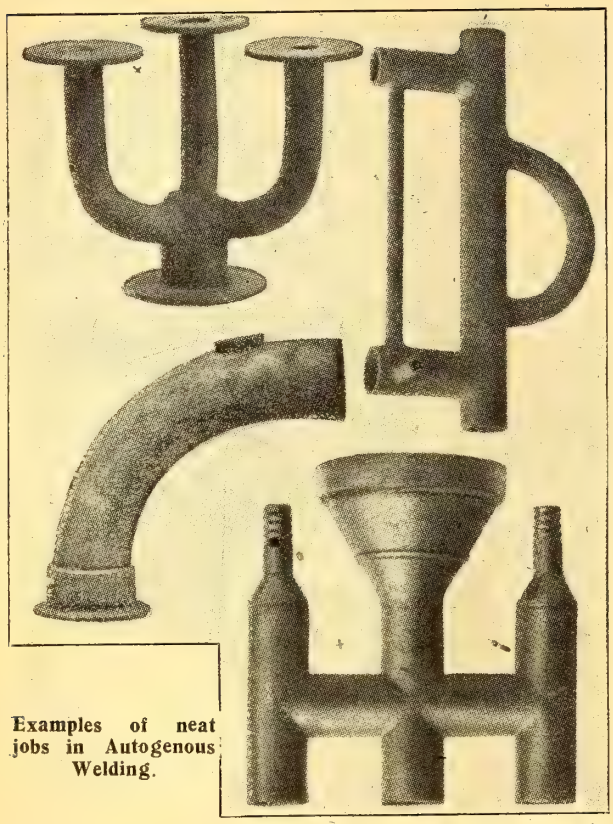
The Apparatus and Its Use.

Naturally it is impossible to indicate, even broadly, the volume to be used for any piece of welding, as that depends solely on the work itself; the thickness of the sheet, the shape of the piece to be repaired, the quality of the metal, and a dozen other conditions on which experience only can decide. Usually, however, a general indicator-chart is supplied—the Société Oxyhydrique used to give one—which narrows down the question within fairly close limits. The only thing is that the supply, be it greater or less, *must be equal* from both containers. But it will be seen that, apart from the varying diameter of the nozzles, one can regulate the size and temperature of the flame absolutely: a thing impossible in the case of acetylene, in which the regulation is fixed to one volume, and, therefore, size of flame for all kinds of work: hence the obvious impossibility of doing sound welding in more than a few kinds.

Just as much as a painter can tell you exactly how to paint a picture by taking a brush in hand, dipping it in this or that colour, and smearing it on the canvas, can I tell you how to use the oxy-hydrogen blowpipe. Or can anyone else? The pip of flame will be anywhere from $\frac{1}{8}$ to $\frac{3}{4}$ of an inch long, according to its regulation for the job, by nozzle or at the container end. But the coloured spot or *grain* in it should be about $\frac{1}{8}$ inch down from the actual nozzle exit. Keep it so; and the full length of it—not less—down on the metal. Thus you will get the flame at its best heat.

Some very General Directions.

Take the blowpipe in the right hand—if it be your less clumsy one—and in your left a rod or wire of the metal of the same kind—and in the case of steel, the selfsame composition and temper—but otherwise of a little better quality; a closer grained finer iron, for instance. Do not, however, succumb to the temptation of holding the blowpipe like a pen. Grip it in balance as near as you can, *not* with the tips of the fingers like a fiddle-bow, but more like a billiard-cue. And to proceed with these preparatory hints, do *not* wear violet glasses or any shade approaching violet. If you do, the rays will irrevocably destroy



Examples of neat jobs in Autogenous Welding.

your optic nerves. Even to use such glasses once may start the trouble. Dark smoked ones, of about a dove grey shade, are the best. They should have gauze sides, as sparks will fly from the best regulated weld. Preferably, too, for your sight's sake, curved glasses, rather than flat.

You are now—assuming the job beforehand to have been made ready, as it is not—about to begin. Now, having opened the valve of the hydrogen container first, screw back the regulator-piece until the needle of the manometer shows the output indicated on the chart for the particular job. Then do the same for the oxygen: assuring *equal supply*. Next, turn the hydrogen supply tap: and *then* the other for the oxygen to the *same* extent: and you will have set the flame in true proportions. For other work, or to stop work, shut off the gases. But in doing this, shut off the oxygen first.

In the case of No. 2 type of blowpipe, for which the town-gas supply is used, observe the same order of opening and closing off. Not only must the combustible gas fill the blowpipe and take the lead, but it is only by gradually regulating the oxygen supply that you can get the appropriate volume—and *the right flame-colour* therewith—for the work in hand.

An indispensable accessory is a wiping pad. This should *not* contain emery, or be in any way like a pincushion. Nor should it be of cork or any other quick-charring—and carbonising—material at all; or the nozzle, instead of clearing, will take a taint from it. Nothing is better than the upturned sole of an old boot, nailed on a corner of the table—which should be a wooden, *not* a slate one—and kept wet.

Preferably—always, indeed, if the work allows—stand the two containers on end, side by side, the oxygen one next to yourself. To make sure of their safety, tie them securely to any convenient post, pillar or wall fastening; and on your left hand, as you may need to make some little adjustment during the weld. Only, keep them well clear of the table.

Now you are in position to begin, at any rate: have all your material, and at least know how to hold it. But—you have now to make ready the parts to be welded; which is half the work of a successful welding job.

De Gustibus Non——.

None of us can avoid his likes or dislikes: equally, none can afford to have any prejudices, at any rate, in technical matters. The one is—or should be—founded on exact evidence with experience to back it: the other is founded—if at all—on anything else: interest, ulterior motive, what you will: and judgment thus based is worthless. Let me therefore disclaim the slightest prejudice against any other variety of autogenous welding than by oxy-hydrogen and its variations.

If it were chemically possible, and anyone brought me a process employing any other two gases that left no chemical defect in the metal, and did the work ever so little better, or merely between a wider range of temperatures, that process I should at once prefer to the oxy-hydrogen process, the moment I had personally tested its claims. Even if its use necessitated an entirely different and special or costly blowpipe or apparatus. That, I should regret; but still, nothing less would be good enough for my work. I could not be so dishonest to my craft, to anything I made, or to myself, as to choose anything less efficient.

The Evidence-in-Chief.

Yet failing anything of the kind, I merely like oxy-hydrogen welding—albeit, I admit it takes a lot of management at first—solely upon the undeniable technical evidence. First, because it puts no taint in the weld: there is nothing in hydrogen but hydrogen, and the oxygen, equally pure, is merely the combustible factor. Secondly, because, while its temperature can go up to 2,250 degrees—some practitioners say more—and is thus above the melting point of all metals except the as yet unisolated silicon, it can, by regulation of the mixture output—*not* proportional variation—be brought down to that of quite soft metals: or as had been said, by substituting town-gas for the hydrogen, to a heat no greater than is needed to make a lead-pipe joint.

On the other hand, there is acetylene. Useless to deny the evidence of its value, as displayed in those exquisite repairs of broken crank-chambers, gear-boxes, even cylinders, and all sorts of things which, mark you, are stationary, container-members rather than stress-members or, if subjected to any stress at all, sustain only a light and constant one. Pieces, notice again, in which it does not matter if the carbon content be considerably increased: in which, indeed, that increase may even be an improvement, which is quite conceivable from the standpoint of metallurgical chemistry. If so, say I, go ahead and use it preferably to oxy-hydrogen.

Notice still further, how marvellously rapid these repairs are. How, indeed, these feats of rapidity are justifiably advertised. Bethink you then what does that point to but the rapid attainment of a sharp, high temperature: with time consequently saved, perhaps 50 per cent., even if you include appropriate warming up beforehand and slow after-cooling; all done—as I am sure they are by these specialists—with the utmost care.

The Aeroplane Aspect.

Very well, but see now the chemical evidence. Look at the comparative density of acetylene as to hydrogen. Does not that fact alone assure, upon the same volume, a much higher number of British thermal units? Is it any wonder that the flame hits up at once to 3,000 degrees? Is it not correspondingly certain that you cannot, on such a caloric output, get the temperature much lower, if any, and keep it as a working flame at all? Here is no special pleading: merely the statement of evidential fact. There



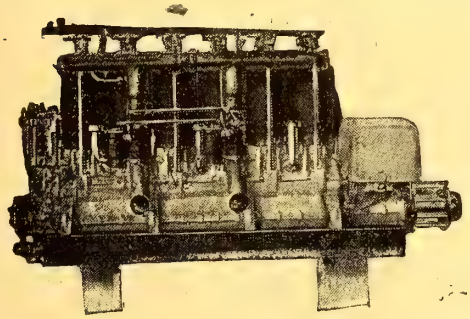
The work of an Artist in Autogenous Welding, showing what can be done with metal and a blow-pipe.



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is the secret of your quick repair of precisely such and such a kind or grouping of pieces. For such, I would not, therefore, look for a better.

Yet if you will excuse my discriminating, that kind or grouping, that variety of pieces, I do not find in aeroplane work: except, perhaps, in some hard-battled crank-chamber. I would not trust any defective cylinder to be mended at all, if it belonged to an aero-motor, by this oxy-hydrogen or any other process. On the other hand, I see all sorts of bearings and copper-smith work; all kinds of stress-pieces of most vital importance made of steel of all degrees of mildness: selected for special elongations, tensilities, temperings, compression-strengths and what not, in the cold: all of which must positively not be varied one iota in the making up: certainly not by 0.001 per cent. of any chemical added or subtracted.

SOME COMPARISONS.

And then I regard the first condition of autogenous welding for all such work; which is that the flame temperature must not be allowed to exceed by more than a very few degrees the melting point of the metal under treatment, unless you would have it rendered brittle. Can I then reasonably be asked to work with a flame that not only contains carbon and possibly phosphorus, but that must exceed by 750 degrees the melting point of any metal bar that one?

Therefore, for such work, the oxy-hydrogen for mine! Slower? No doubt, a little. The remedy is, a bigger bay and more blowpipes for the same output of parts to which you can faithfully honestly entrust the lives of better men. More costly? I admit, neither oxygen nor hydrogen are cheap; but the quality of the work they do is cheap at any price; and actually, unwastefully used, it is astonishing how they last out. And what with the hardiness and simplicity of the plant, I doubt if, in the long run, there is five per cent. difference in the expense.

AND AVIATION USES.

I could give quite a series of expensive photographs to show the difference of the work done by one process and the other: but that I see no good in creating a prejudice against one process so manifestly employed out of its appropriate job. But for oxy-hydrogen, I will say that I see nothing metallic on or about the present marvellous constructions called aeroplanes that it will not reliably fit: and when the chiefly-steel or truly all-metal type becomes standard, I see its uses increased tenfold.

I have neither actual experience nor judgment sufficient to say whether a sheet-steel seamlessly-welded petrol tank would, or not, be better than a lip-seamed copper one. My opinion on that point would be prejudice. I simply offer then the comparison of the atomic weight and tensile strength of sheet steel and sheet copper. I do not even know for certain by what process the seamless steel petrol barrels of one well-known firm happen to be welded. Suffice it for me that they *are* steel, and manifestly autogenously welded. Draw your own conclusions.

GENERAL PURPOSES CONSIDERED.

Now as to the sort of general work the oxy-hydrogen process of autogenous welding is fit for. Take cast-steel, the use of which is so general in the basal or body parts of machine-tool construction, etc. These parts betray—how often, only after a breakage has occurred or much work been done upon them?—all sorts of little defects, blowholes, cracks, etc. Nothing is easier than to repair them with the blowpipe where they stand. In fact, it is better not to dismount them, as they will be held up, naturally, in the best possible position for the repair.

It is sufficient to clean the edges of the crack or open the hole with a scraper; and then run in the metal from a wire of the same sort of steel. Heat up slowly, but do not run in the metal until the part is white hot, or, better, just running at the edges, in fact. Cool off slowly, of course, with a lessening flame; and while the mend or weld is still in a doughy condition, hammer lightly and very rapidly with the lightest of hammers: and even so after the whole "heal-up" has been reconstituted solid, it is well to give the part a second light re-heating to harmonise all interior molecular tensions. Which, for the sake of economy, had better be done with the No. 2 blowpipe, using town-gas.

Similar defects will, of course, occur in the much more delicate and costly bronze castings of all sorts; so their repair in the same way—much cheaper and more rapid than recasting—is even better worth while. Likewise, the finer pieces of aluminium casting.

BOILER WORK AND THE LIKE.

Needless to say, oxy-hydrogen welding has revolutionised boiler-work; and now that it seems as if—able to afford petrol only for aviation and the cars of the Air Board, and coal-gas for the mercantile plutocracy—we others would have to use coke-fired flash-boilers for our automobiliary occasions, so that the most beautifully supple of fluid pressures, white-hot steam, comes to its own, one can readily see a recrudescence of all sorts of ideas and models in flash-generator manufacture; in which oxy-hydrogen autogenous welding will be the whole box and dice, team and dog under the waggon. Imagine the certain indestructibility and strength of a tube joint, expanded into a header, and then, not merely swaged, but welded in solid with that same!

Now, too, that the kitchen-range has been found out as the coal-hog it is, with the appetite of an ocean-liner, and there are to be no servants left, think of the ideal homes to be created by the patent stoves seamlessly welded, that cook a several course meal with a single gas-burner concealed in their midriff!

THE KNELL OF BRAZING.

But these prospects apart, where we used costly copper smithery for all sorts of pipework, we shall use various drawn steel tubes, the shaping and joining of which in collars, curves, elbows, bends and T or + pieces, can all be done rapidly *and* soundly, with the oxy-hydrogen blowpipe. And where we must use copper or brass tubing, we can displace brazing, and gladly. How many explosions have been caused by the slow perishing of the brazing owing to the voltaic couple set up by the presence of zinc and copper in chemical contact?

For the brazing thus transforms the copper at such a joint into a weak spongy substance, because of the change of the zinc into an inorganic salt. What again, is the effect of the fatty acids of heated oils running through lubrication tubing, likely to be upon the brazed joints? Yet on a welded joint, none whatever!

Literally, there is nothing that cannot be done—apart from sheer machining of parts, which incidentally it helps to save—by autogenous welding. What can be done, as a sublimation of blowpipe craft, if an artistic outrage, I illustrate herewith: merely asking whether it could, imaginably, have been committed by any other process than the oxy-hydrogen flame. It was, however, committed, and exhibited, at Liège, just twelve years ago.

Truly, the whole of it is a matter of imaginative application, and practice without hope of ever attaining perfection. You may reach great facility, even eminence. Somewhere, perhaps, there exists a finer fiddler than Kreisler. Only, never forget, in autogenous welding, that "By *hammer* and hand, all arts do stand."

AN INTERESTING OPENING CEREMONY.

Unfortunately owing to Tuesday, October 16th, being Press day, and owing to almost the whole Staff of this paper being in one or other of His Majesty's Services, it was impossible for a representative of THE AEROPLANE to attend the interesting ceremony booked to take place on that day at the Whitehead Aerodrome, at Hanworth Park, Feltham. According to the elegant invitation cards sent out by Mr. Whitehead, Colonel the Right Hon. Sir William Henry Dunn, Bart., Lord Mayor of London, was booked to play the chief part. The Directors of Whitehead Aircraft (1917) Ltd., had been honoured by the consent of Sir William Henry Dunn, Bart., "to perform the ceremony of diverting the Cardinal Wolsey River by means of a Reinforced Concrete Inverted Syphon and formally Opening the Aerodrome."

One deeply regrets one's inability to attend the ceremony, which must have been as diverting to the happy guests as to the Cardinal Wolsey River. One has frequently seen formal opening ceremonies performed by the breaking of a bottle of champagne or such container of liquid mediums, but never yet has one seen a Reinforced Concrete Inverted Syphon used for the purpose. Recollections of the diversion caused on any stage by the importation of a syphon into the bye-play of the performance suggests dimly the possibilities of such a syphon as that used on this occasion. One wishes the Aerodrome and the Cardinal Wolsey River every success in their new mode of life.

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THE PATENTS INDEX.

The subjoined list of inventions has been specially compiled by THE AEROPLANE from the current Official Patents Records.

PATENT APPLICATIONS.

Ayling, G., and G. J. Construction of girders, spars, struts, etc., for aircraft. No. 14490. Oct. 6th.
Bourke, A. M. Announcing movements of aircraft. No. 14435. Oct. 5th.
Burdick, C. L. Balloon light. No. 14263. Oct. 3rd.
Dunbar, E. Airships. No. 14454. Oct. 6th.
Fowler, A. H. Method of maintaining power of aero-engines at high altitudes. No. 14366. Oct. 4th.
Gordon, D. Machine for building propellers for aircraft, etc. No. 14131. Oct. 1st.
Grillet, L. Aeroplanes. No. 14265. Oct. 3rd.
Lefèvre, C. Airship. No. 14124. Oct. 1st.
Macgregor, A. A. Gyroscopic apparatus for steering aircraft. No. 14443. Oct. 5th.
Mond, A. Means for doping aeroplane, etc., fabric. No. 14126. Oct. 1st.
Prior, B. Propellers for aircraft and manufacture thereof. No. 14299. Oct. 3rd.
Prior, E. G. Struts, beams, poles, etc., and manufacture thereof. No. 14300. Oct. 3rd.
Ripley, H. Means for locating aircraft. No. 14214. Oct. 2nd.
Soper, J. M. Method of silencing exhaust of motors of aircraft. No. 14282. Oct. 3rd.
Southwell, R. V. Method of balancing automatic valves for airships. No. 14453. Oct. 5th.
Townsend, R. T. Time-indicator for use on aircraft. No. 14245. Oct. 2nd.
Tritsch, E. M. Speed, course, and stability indicators for flying-machines. No. 14325. Oct. 4th.

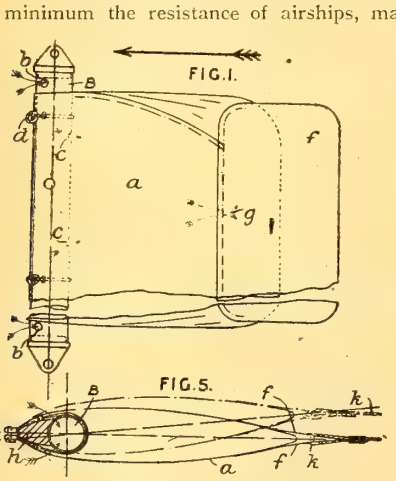
COMPLETE SPECIFICATIONS ACCEPTED, PRINTS OF WHICH CAN BE OBTAINED ON AND AFTER OCTOBER 25TH, 1917.

102,732. Dec. 11th, 1915. Le Bozec, L. Apparatus for feeding petrol, oil, or the like to engines or other apparatus.
109,905. April 4th, 1917. Caygill, F. J. Parachutes for use with aircraft.

ABRIDGMENTS OF RECENTLY PUBLISHED SPECIFICATIONS.

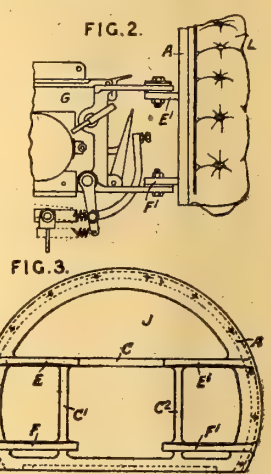
108,535. Aircraft, Marine Vessels, etc. BLACKBURN AEROPLANE AND MOTOR CO., and SAYERS, W. B., Olympia, Leeds. Aug. 14th, 1916, No. 11447. [Classes 4, 25, 113 (i), and 115.]

RESISTANCE TO PROPULSION, REDUCING.—In order to reduce to a minimum the resistance of airships, marine vessels, and other bodies moving through fluid, these bodies are provided with flexible envelopes which are capable of self-inflation during movement through the fluid so as to assume a streamline form. As applied to the strut or tube B, Figs. 1 and 5, of an aeroplane or airship, the envelope *a* is attached directly to the tube B by lacing *d*, or to a nose-piece *h* which is strapped to the tube B by straps so as to swivel thereon. When in motion, air passes through into the envelope which is thereby inflated. Strips *f* of fabric are sewn to the sides of the envelope and are joined, as shown, to form a tail. Holes *g* in the envelope are adapted to be uncovered by the strips *f* if the envelope becomes unduly distended so that air is allowed to escape. The envelope may be left free to take up its own form and direction in the wake, or stretching wires *k* may be attached to the tail to prevent or reduce undue flapping or fluttering. Fig. 11 shows the envelope as a flexible aeroplane wing *a* supported on a bow-like spar a^1. The fabric is retained at intervals in the approximate streamline section by partitions *s*, and is supported at the nose by wire *x* stretched from k^1 to a point near the body of the aeroplane. The rear part of the wing is stretched by cords or wires *v* to a point *w* on the fuselage or body. The openings for entrance of air are indicated at b^2. The stay or bracing wires of aircraft may be fitted with similar flexible streamlining envelopes. Fig. 12 shows the application of the envelope to the masts and funnels of ships, and to the brackets, below water, which carry the bearings of the propeller shafts *z*.



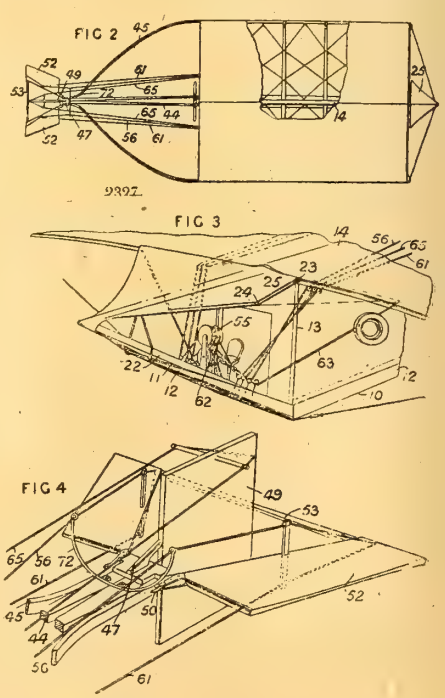
108,598. Wind or like Screens. SOPWITH AVIATION CO., and SOPWITH, T., Kingston-on-Thames. Nov. 1st, 1916, No. 15620. [Classes 92 (i), 92 (ii), and 103 (ii).]

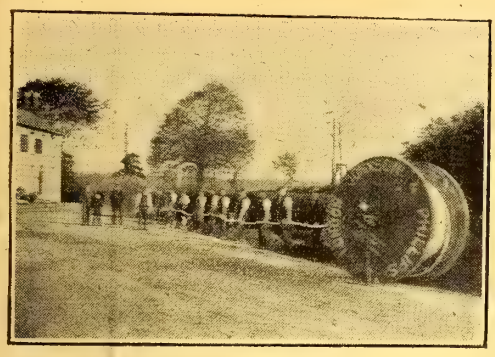
In order to prevent injury to the occupant of an aeroplane or the like by violent contact with the wind or similar protecting-screen such as is provided for use in sighting a gun, the glass screen J, Fig. 3, is surrounded by a frame A preferably of D-shape, having a padded cover or cushion L, Fig. 2. The frame is provided with horizontal and vertical cross-bars, C, C^1, C^2 having lugs E, E^1, F, F^1 by which the frame may be secured to the end of a gun G.



108,625. Aeronautics. JOHNSTON, B., Quarters "C," Mare Island, Vallejo, California, U.S.A. Dec. 14th, 1916, No. 17969. [Class 4.]

AERIAL MACHINES WITHOUT AEROSTATS; PLANES, CONSTRUCTION OF; STEERING AND BALANCING; CARS.—An aeroplane comprising a main plane mounted above the body and having an elevator and rudder carried on rearwardly-extending spars has a triangular plane in front adapted to be turned about a longitudinal axis in conjunction with movements of the rudder. The floor 10 of the cabin has a forwardly-sloped triangular portion 11, and side flanges 12 for attachment to vertical members 13. Struts 22 support the outer end of a backbone 14 on which is pivoted a spar 23 stayed by wires 24 to the front on the backbone 14 and covered with canvas 25 to form a plane. Lateral members 45 extend rearwardly from the edges of the main plane and are bent to meet members 44 extending from beneath the cabin. A rudder 49 is pivoted about an axis 47, and an elevator consisting of two members 52 connected by a rear spar 53 is pivoted at 50. The elevator is operated by cords 56 passed through eyes in a member 72 and by cords 61, both cords being led over pulleys to a drum 55 mounted on the sloping portion 11 of the





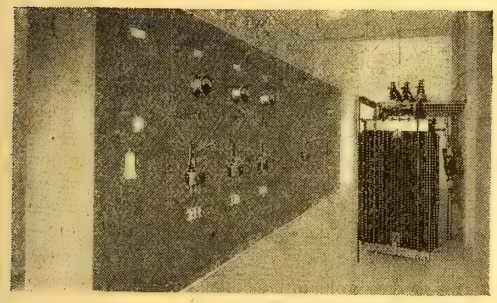
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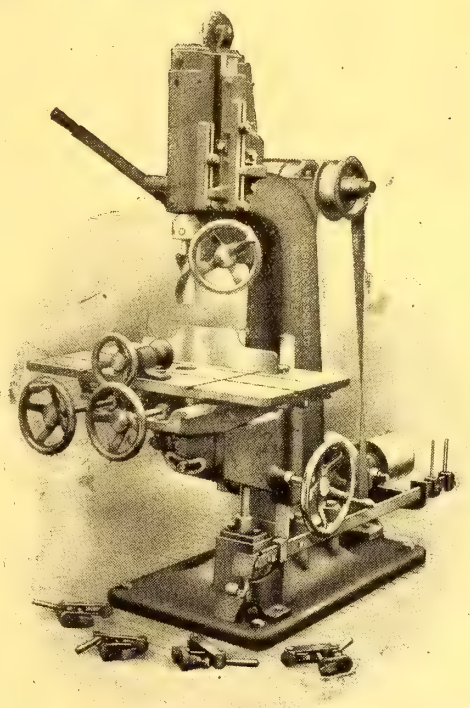
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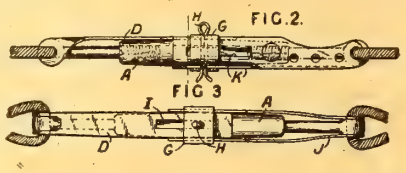
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cabin. A drum 62 on the same pillar operates through cords 63, 65, the plane 25 and the rudder 49 simultaneously.

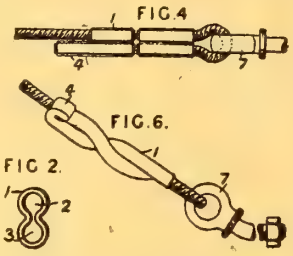
108,605. Wire Strainers. DYE, L., 188, Hearsall Lane, and SEED, E. A. D., 2, Market Street, both in Coventry. Nov. 8th, 1916, No. 15993. [Class 45.]

A locking-device for wire strainers of the turnbuckle type comprises a finger D hinged to the wire cable and slotted at I to receive a locking-pin H which passes through the part D and the screwed sleeve A. A second trough-shaped locking-member J secured to the other wire and slotted at K may be provided together with a square sleeve G which embraces both locking-members and through which the pin H passes.



108,608. Rope-fasteners. MCCABE, I. E., Lexington, Nebraska, U.S.A. Nov. 9th, 1916, No. 16081. [Class 109.]

Relates to means for securing the end of a cable to an eye-bolt or the like, and more particularly for securing the end of a wire cable used as a guy or brace to the framework of an aeroplane. The cable end part is passed through a passageway 2, Fig. 2, in a pliable metal sleeve fastener 1 of 8-section. It is then passed through the eyebolt 7^1, Fig. 4, and returned through the other passageway 3 in the fastener. The passageway 3 is formed longer than the other, to allow of the end portion 4 being turned back upon itself. The fastener is then twisted as shown in Fig. 6.



WEAVERS' WAGES.

The award of Mr. Vesey Knox, who held an arbitration on the application of tenters employed in Belfast weaving factories for an increase of wages, was issued on October 10th. It concedes an advance of 9s. per week to men employed on or in connection with munition work.

A SMALL SINGLE-PURPOSE LATHE FOR AEROPLANE STRAINERS.

The photograph herewith illustrates a small single-purpose lathe, designed and manufactured specially for Aeroplane Strainers by the East Anglian Engineering Co., Ltd., Stowmarket.

Some few weeks ago it was found necessary to purchase a small lathe for producing these parts on a large scale, with unskilled girl labour. As it was impossible to obtain anything like reasonable delivery, it was decided to manufacture a number of these small lathes, and Mr. Burch, works manager, designed the above simple lathe.

The object kept in view was Rigidity, Simplicity and Cheapness. A pattern was found for the legs, and, although rather heavy, it was used without alteration. The bed was made of a double Vee slide, broad faced, with the headstock cast in one piece. A mild steel spindle of large diameter, fitting into gun-metal taper-bushes, and a three-step cone, with broad faces, made a very powerful drive.

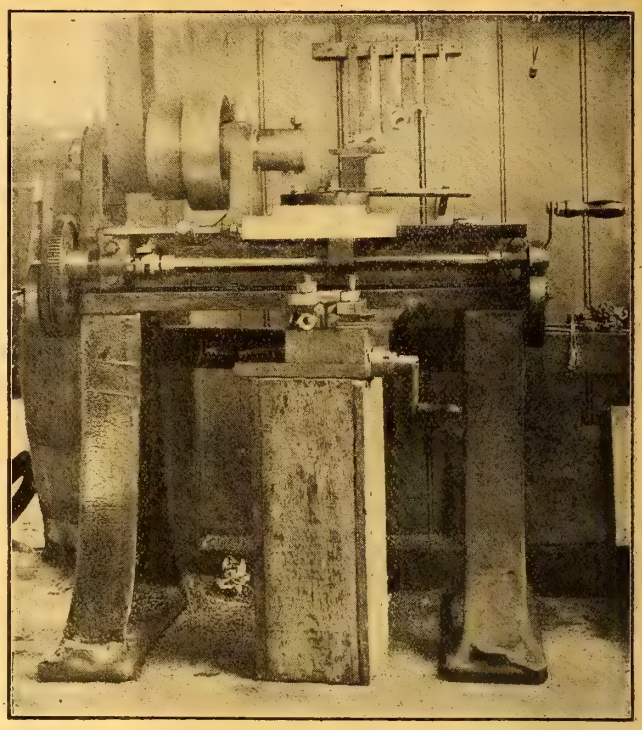
The saddle is of simple design, with a single screw having micrometer adjustment, but is so arranged that it can be fixed in any position by a bolt in a Tee slot, thus allowing for taper-turning, the feed in this case being by hand.

The lead screw is an ordinary Vee thread, and is operated by a three-step feed-cone from the main spindle, and driving through a friction clutch.

An adjustable stop is arranged on the front of the bed with a fine adjustment on the saddle. The saddle can be traversed up to the stop, the friction clutch in the feed-cone giving the necessary slip required. A convenient handle at the left operates the feed-screw, and a handle on the right gives a rapid hand-control over the same.

All the handles are easily reached by the operator whilst seated at the machine; this is an important matter, as a female worker can easily work eight to ten hours without being fatigued.

The lathe, as illustrated, is shown with the slide removed, and a simple rounding attachment is fixed. The slide is shown in front of the lathe, and is set up with double tools for reducing the small pieces. The chuck was some considerable trouble, as



The East Anglian Co.'s Single-purpose Lathe.

it was impossible to fit up spring collets, etc. Finally this was made of C.I., with small hardened steel bushes.

With this lathe we found it possible for an untrained female to operate it in a few hours and to produce these small pieces accurately within 0.001 in. The method adopted is to divide each steel and bronze piece into a number of simple operations, each of which takes about one to two minutes.

WHITECRAFT.

The present war has offered many opportunities for those who, in the language of an American contemporary, are heavy depositors in the Bank of Nerve and Imagination, to become famous in a very short time, and if Mr. J. A. Whitehead, Governing Director of the Whitehead Aircraft Co., Ltd., of Richmond, is covetous of fame—which one is assured he is not—he cannot but be enjoying his full meed, for his name is abroad the width and the breadth of the land as the inventor of Mother's Day.

Only yesterday, unless an unkind fate intervened, with the assistance of the Lord Mayor of London, he diverted the historic Cardinal Wolsey River from its natural bed which flows through the Whitehead estate at Hanworth Park, a feat which entitles him to go down to history along with Moses and Canute as a Professor of Hydrostatics.

Yet another example of almost startling publicity is found in that very old and respectable weekly "The Car," which has devoted a special issue to advertising Mr. J. A. Whitehead and all his works. Most of the leading article is composed of an appreciation of Mr. J. A. Whitehead, and four profusely illustrated articles on various aspects of Mr. Whitehead's activities also appear. "The Car" has seized the opportunity with so such enthusiasm that ten pages of its fifteen pages of text are devoted to this absorbing subject.

One feels sure that this overwhelming tribute to Mr. Whitehead's enterprise is entirely spontaneous, and there seem to be indications in the special articles that they were not inspired by the subject of their eulogies.

For instance, the article by Mr. George Neill says:—"It is wholly owing to the energy and ability of such men as Mr. Whitehead that the science of aviation has been advanced so rapidly." . . . "To keep our memories green and to impress upon the public the celerity of development accomplished, here are a few salient facts in relation to the industry." The writer goes on to record various outstanding dates in the aircraft industry starting from 1900 and extending to 1912.

One is perfectly sure that Mr. J. A. Whitehead would be the first to disclaim the title of pioneer, as such. In fact, it is rather a matter of pride to him that the Whitehead works only commenced operations in 1915. Nevertheless, he is certainly a pioneer in the particular form of meteoric performance for which he has become so well-known in the Aircraft Industry.

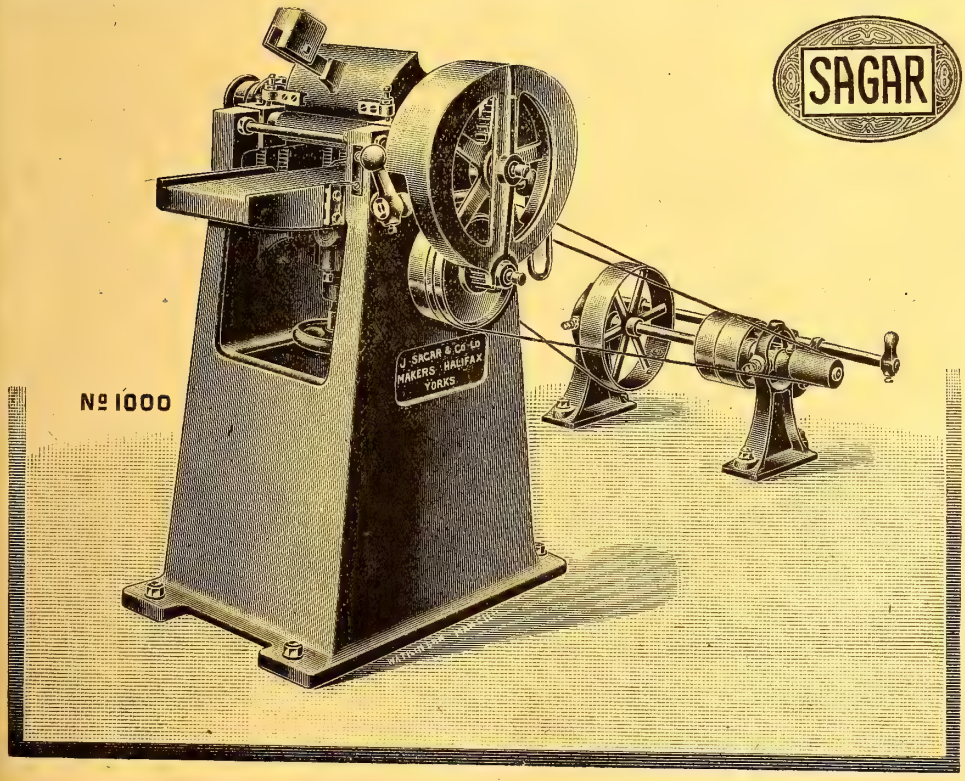
One looks forward with interest to the next manifestation of Mr. Whitehead's unique ability.



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AIRCRAFT FINANCE

CURRENT TOPICS.

The Conversion of Private into Public Companies.

The benefit to be derived by working a business as a private company under the Limited Liability Acts was fully set out in these columns in the previous issue, and, judging by the amount of correspondence I have received, appears to have interested a very large number of my readers. One correspondent, adopting the nom-de-plume of "Factor," raises a point of more than general interest. He writes inquiring whether a private company can be converted into a public company, and, if so, what are the necessary formalities.

The Companies (Consolidation) Act, 1908, specially provides the necessary machinery for carrying this into effect. Section 121, sub-section 2, provides:—

> "A private company may, subject to anything contained in the memorandum or articles, by passing a special resolution and by filing with the registrar of companies such a statement in lieu of prospectus as the company, if a public company, would have had to file before allotting any of its shares or debentures, together with such a statutory declaration as the company, if a public company, would have had to file before commencing business, turn itself into a public company."

So soon as the formalities have been carried out, the company would then be in a position to allot shares to any number of subscribers—i.e., the number of its members, hitherto limited to 50 as a private company, becomes unlimited, and, subject to complying with the Treasury order with regard to public issues, may issue invitations to the public to subscribe for its capital or debentures. The increase of the capital of the company would be carried out simultaneously, and this would entail the payment of the additional fees on the increased capitalisation to the Registrar of Joint Stock Companies.

The statutory fees for a company with a nominal capital of £50,000 are as follows:—Duty on capital, £125; fee stamp on memorandum of association, £16 5s.; deed stamp on memorandum, 10s.; deed stamp on articles, 10s.; fee stamp on articles, 5s.; fee stamp on notice of office, 5s.; total duty and fees, £142 15s.

The Meaning of "Treasury Consent."

Treasury consent is apparently not essential if capital to be raised is to be obtained privately. This point appears to be imperfectly understood. The Treasury have no legal machinery to control or prevent any issue of shares.

Recipients of prospectuses should bear this in mind, as many are under the impression that because a prospectus is issued it must necessarily have received Treasury consent.

The only course the Treasury may adopt where issues are made without "Treasury consent" is to publish a notice in the Press that the Treasury consider such an issue to be contrary to public or national interest. This was the course adopted quite recently in connection with a share issue made by advertisement in the Press.

It is different in the case of debentures, as the debenture bond, before becoming "legal tender," requires stamping, and Somerset House officials refuse to accept the bond for stamping unless accompanied with the written Treasury sanction. Consequently the Companies department, acting in harmony with the Treasury, are thus able to enforce compliance in so far as it affects debenture issues, but is powerless, for want of legal means, to prevent issues of shares. Be it noted that the Treasury view favourably any issue if it can be shown to be of "national interest," consequently the aeroplane industry, being essentially of national utility, should support the Treasury views in every way in its power.

[For which reason any issue of shares in aircraft firms which are made without it being clearly stated that they are issued with Treasury consent should be viewed with suspicion.—Ed.]

Balance-Sheets and the Companies Acts.

The Companies (Consolidation) Act, 1908 (section 113, sub-section 2), stipulates that "The auditors shall make a report to the shareholders on the accounts . . . and the report shall state (a) whether or not they have obtained all the information and explanations they have required, and (b) whether, in their opinion, the balance-sheet referred to is properly drawn up, so as to exhibit a true and correct view of the state of the company's affairs, according to the best of their information and the explanations given to them, as shown by the books of the company."

Section 3 stipulates that "the balance-sheet shall be signed by the directors." Section 4 provides "that if a copy of the balance-sheet has not been signed as required by the Act, be issued, circulated, or published, the company, every director, manager, secretary, or other officer of the company knowingly and party to the default, shall be liable to a fine not exceeding fifty pounds."

From this it will be seen that the Act is very definite and very clear, and would appear to cover all the necessary requirements for the protection of the shareholder. Unfortunately in actual practice, notwithstanding what would appear to be the protective clauses in the Act, the customary balance-sheet issued to-day is anything but a clearly defined statement of affairs understandable by men of ordinary business intelligence.

What Is a Balance-Sheet?

A balance-sheet is generally defined to be a statement of liabilities and assets, but even this is incomplete, as in many cases items are included as liabilities which are not, strictly speaking, liabilities, such as reserve fund and balance of profit and loss, whilst on the asset side items may appear as accumulated loss, to the debit of the profit and loss account, and expenditure carried forward not represented by any available assets. When to these factors are added looseness of statement, want of method, lack of reasoning, and total absence of

logical precision, one is bound to arrive at the conclusion that accountancy is by no means the exact science which it represents.

The gravest charge which can be brought against the balance-sheet of many aeroplane and kindred concerns is the manner in which wasting assets are dealt with. When one sees grouped under one head such items as freehold and leasehold properties, fixtures, machinery, plans, designs, and fittings, all included as one item in one lump sum, it is perfectly clear that no logical method of depreciation can possibly be arrived at.

No method of book-keeping or accountancy can do away with the fact that the value of a ten years' lease should be redeemed in ten years, and that ten per cent. of the sum for which this lease figures in the books of the company should be redeemed each year. But this item is carefully hidden by grouping together in a mass partly fixed assets, partly wasting assets, and partly assets originally legitimate, but now of no value.

It is therefore clear that it becomes impossible (1) for the accountant to deal with the redemption of wasting assets in a logical, sound, and proper manner, and (2) equally impossible for any shareholder, however intelligent, to ascertain the true position of the company. Notwithstanding the careful manner in which the Act has been framed to give to the shareholders the greatest possible protection, it provides no legislation to deal with these important points.

Foreign Trade Regulations.

The Controller of the Foreign Trade Department has issued a new consolidating list, which should be in the hands of all aircraft firms trading abroad, containing the names of over two thousand persons and firms with whom persons in the United Kingdom are forbidden to trade under the "Trading with the Enemy Proclamation."

The Department states that although the statutory list has now been in existence for a year cases still come to the notice of the Controller in which firms are corresponding with persons on the statutory list, and they not infrequently give as an excuse that they have never heard of the list. It is important that everyone engaged in foreign trade should realise that he is under an obligation to make himself familiar with the statutory list, and to observe it in his dealings.

Failure in this respect renders him liable to the heavy penalties provided by the Trading with the Enemy Acts, and these apply to holding any communication whatever with anybody on the statutory list, and not merely to entering into an agreement or continuing to carry on business with such persons. In exceptional cases, where it appears to be necessary, and where it is not contrary to the public interest, a licence may be obtained from the Foreign Trade Department exempting from the prohibition.

Copies of the consolidating list and of all additional lists may be obtained at a small cost from the Superintendent of Publications, His Majesty's Stationery Office, Imperial House, Kingsway, W.C.—G. A.

ANSWERS TO CORRESPONDENTS.

A Financial Specialist will be pleased to answer in these columns inquiries on any subject affecting or relating to Investments, Stocks, Shares and Securities of Aircraft and kindred companies, free of charge.

"Equality."—Many thanks for the cutting which you send me. There is no doubt that something in the direction of compelling directors and officials to make disclosure of their dealings in the shares of the company which they are presumed to control should be published for the benefit of shareholders, but I much fear that a law to carry this into effect could so readily be evaded as to become practically inoperative. It would be such an easy matter for anyone not wishing to appear in the transactions to have the shares put in the name of relatives or nominees. Still, it is a point that merits deep consideration, and I am obliged to you for bringing the paragraph in question to my notice.

"Rigid."—A company may not purchase its own shares, notwithstanding any special power provided in its articles of association. However much it may be to the advantage of the company so to do, it is illegal, as by doing so it would have the effect of reducing the share capital of the company.

"Justice."—The shares being only partly paid the liquidator has a legal right to call upon you to pay up the balance remaining uncalled on the shares, and may proceed to enforce payment by legal proceedings if you fail to comply.

"Comparison."—You have omitted to take into consideration the sign affixed to the official quotation which denotes that the transaction in question was in respect of "a small amount," seller paying stamp and fee. The single asterisk against a price recorded in the official list means that "the bargain was effected with or between non-members."

COMPANY NOTES.

Fellows Magneto Co., Ltd.

This Company, in making the declaration of the payment of the first half-yearly dividend at the rate of 8 per cent. per annum, issue a special letter to the shareholders, of which the following extracts are the principal points. Since the Company commenced trading, the original size of the factory has been nearly trebled, and the output during the three months (May, June and July), for which the accounts are completed, shows a steady increase of the business, and the directors expect that by the end of the year the output will exceed £14,000 per month.

A very interesting point is the announcement that Treasury Consent has been granted for an issue of a further £40,000 in Preference shares. One awaits full information, which one will take the earliest opportunity of placing before our readers.—G. A.

New Company Registration.

Wycombe Aircraft Constructors (Ltd.). Registered October 5th, 1917. Capital, £50,000 in £1 shares.

Company in Liquidation.

General Aviation Contractors (Ltd.), 25 to 28, Crosby Buildings, Crosby Square, creditors and contributories. First meeting, October 24th, at Carey Street, Lincoln's Inn, London.

The Birmingham Small Arms Co., Ltd.

The annual ordinary general meeting of the Birmingham Small Arms Co., Ltd., was held at the Grand Hotel, Birmingham, on Oct. 12th. Sir Hallewell Rogers, chairman, presided.

The supplementary report of the directors and the balance-sheet as at July 31st, 1916, having been adopted, the chairman proposed the adoption of the report for 1917, which recommended a dividend of 5 per cent. and a bonus of 2s. per share on the Ordinary shares, leaving, after £150,000 had been transferred to general reserve (making it £400,000), a balance of £170,306 3s. 11d. to be carried forward.

The chairman said:—The record of your company during the past year has been one of steady increase in the supply of several important munitions of war, and of untiring effort of all concerned in the company, managers and workers alike, to

CURRENT QUOTATIONS.

The following are the current quotations made up to Tuesday morning in each week of the principal companies engaged in the Aircraft Industry and Kindred Trades.

Aircraft Mnfg. Co.	7% cum. pref. £1 ...	22/6	23/6
Armstrong (Sir W. G.) Whitworth & Co., Ltd.	4% cum. pref. £5...	3-5/16	3-7/16
	5% 2nd. pref. £1 ...	17/-	18/-x
	£1 ordinary	38/6	39/6
Austin Motor Co., Ltd.	7% cum. pref. £1...	18/-	19/-
	£1 ordinary	25/-	26/-
Birmingham Small Arms Co., Ltd.	£1 ordinary	55/6	56/6
	5% cum. "A" pref.	4-5/16	4-7/16
	6% cum. "B" pref.	19/6	20/6
Boulton & Paul, Ltd.,	5% cum. pref. £1	⅞	1
Brown Bros., Ltd.,	6% cum. pref. £5...	4⅛	4⅜
Darracq (A) & Co., (1905) Ltd.	£1 ordinary ...	35/-	36/-
	7% cum. pref. £1...	22/6	23/6x
Electric Construction Co., Ltd.	7% cum. pref. £1...	19/3	19/6
	£1 ordinary	1	1-1/16
Fellows Magneto Co.,	8% cum. partip. pref.	17/-	18/-
General Electric Co., Ltd.	6% cum. pref. £10	10-5/16	10-7/16
	£10 ordinary	17	18
Gwynnes, Ltd.,	5% cum. pref.	91½	92/-
	Ordinary	8/3	8/6
Greenwood & Batley, Ltd.,	£10 ordinary	9	10
Humber, Ltd.,	6% cum. pref. £1	17/-	18/-
	£1 ordinary	17/-	18/-
Napier (D) & Son, Ltd.,	7½% cum. pf. £1	18/-	18/6
Peter Hooker, Ltd.,	£1 ordinary	21/-	22/-
Rolls Royce, Ltd.,	£1 ordinary	57/6	58/6
Rudge Whitworth, Ltd.	£1 ordinary ...	43/-	44/-
Ruston, Proctor & Co., Ltd.	£1 ordinary	26/-	27 -
	5% cum. pref. £1 ...	17/-	17/6
Sunbeam Motor Car Co., Ltd.,	£1 ord...	88/-	90/-
Straker Squire, Ltd. (1913),	£1 ordinary	23/-	24/-
S. Smith & Son, Ltd. (Motor Accessories)	£1 ordinary	26/-	27/-
Triplex Safety Glass,	£1 ordinary... ...	22/-	23/-
Vickers, Ltd.,	5% pref. stock...	78	82
	5% pref. shares. £1 ...	17/-	18/-
	£1 ordinary	39/-	40/-
Wm. Beardmore & Co., Ltd.,	6% c. pf. £1	19/-	19,6

GENERAL INFORMATION.

Armstrong, Whitworth (1916).	Owing to the difficulty of estimating liabilities under Finance and Munitions Acts, the accounts will not be ready until a later date.
Austin Motor (1916).	
Rolls Royce.	
Rudge Whitworth.	
Straker-Squire (1915).	
Sunbeam Motor.	
Thorneycroft (J. I.) & Co.	
Vickers (1915 and 1916).	

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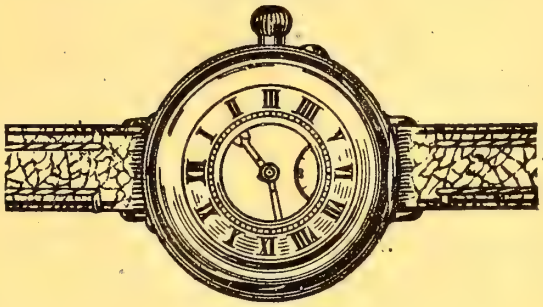
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meet the ever-growing demands of the Ministry of Munitions in various supplies. The departments have been devoted almost entirely to Government work. The deliveries of Service rifles have been in excess of our promises to the Government, and have now reached a steady output which, before the war, was hardly dreamt of. Our efforts have contributed materially to relieve any anxiety in this direction.

A still more important development at our works has been in the manufacture of the Lewis automatic machine-gun, which has been, and is being, turned out in numbers greater even than the Ministry of Munitions at one time thought possible. I think it would not be out of place for me to say here that the country is indebted for this weapon, which has had so great an effect in the fighting, first to the ingenuity and patent work of the inventor, Colonel I. N. Lewis, late of the U.S. Coast Artillery; secondly, to a group of Belgian gentlemen, headed by Mr. Joseph Waterkeyn, who, a year or more before the war, saw the possibilities of the gun, and formed a company to purchase the European patent rights; and lastly, to this company which, in 1913, recognising the merits of Colonel Lewis's invention, entered into an agreement with the Belgian Company whereby the European manufacturing rights were secured, and at once commenced on the manufacture of models.

Orders were placed by the British War Office on the outbreak of war, first in small quantities, but increasing ever since. I do not hesitate to say that when the history of this war comes to be written in detail the Lewis machine-gun will have very prominent mention as one of the outstanding advances in weapons of war which contributed so much to the success of our troops. Our cycle department, although occupied to some extent in the supply of military bicycles and motor-bicycles to the English and Allied Governments which have been required on all fronts, has been largely devoted to the manufacture of parts of aeroplane engines and aeroplanes.

The Daimler Company.

At Coventry, the Daimler Company's works also have been given over entirely to the supply of Government requirements; in the early stages of the war the manufacture of vehicles for the Mechanical Transport for a time took the whole output. Heavy projectiles have been delivered in large quantities. In December last, at the urgent request of Dr. Addison, the then Minister of Munitions, your directors willingly loaned to the Ministry the services of our able managing director, Mr. Percy Martin, as Controller of Internal Combustion Engines, and also as a member of the Air Board representing the Ministry of Munitions.

Future Development of Trade.

After referring to the balance-sheet, the chairman concluded: All industrial concerns are naturally interested at the present time in the future development of trade after the war. Your directors place this in the forefront of their future policy, and believe that our welfare will depend entirely upon the co-operation of capital and labour. From this point of view they are interested in the National Alliance of Employers and Employed, the outcome of which they believe will result in the production of a programme adopted by both employers and employed which should put their mutual relations on a satisfactory footing. We feel convinced that the real workers in this country will not be led away from the essential issues of the future, a due recognition of which is necessary to the welfare of the workers themselves, and that they will not be misled by the few, though noisy, agitators who are advocating an extreme policy which, if adopted, would lead to the destruction of the commerce and industry of the country. Your directors believe in the soundness of the British workman and public, and, therefore, have no fears of that happening, which is happening in enemy countries, according to the news of the last few days. All classes having fought side by side in this great war, it is not too much to expect that they will continue to fight side by side in the cause of industry.

Mr. E. Manville seconded the motion, and explained the working of the National Alliance of Employers and Employed, remarking that the representatives of Labour associated with it were fair and broad-minded men, and if they could only carry their rank and file with them in the proposals that were being discussed, there need be no misgivings as to the future of the industry of the country.

The resolution was carried.

It was decided to double the directors' fees for 1916-17, and it was stated that Mr. Neville Chamberlain, who left the board to take up Government work, would shortly rejoin.

THE SOPWITH CO.'s SPORTS.

As a result of the success of the works sports recently held by the Sopwith Aviation Co. at Kingston, a sum of £120 18s. 9d. is available for the Flying Services' Fund, instituted by the Royal Aero Club. Owing to the generosity of the directors of the Sopwith Aviation Co., this amount has been increased to the round sum of £125. One understands that a cheque for this amount has been handed to the secretary of the Royal Aero Club.

THE TURIN-LONDON FLIGHT.

It is interesting to note that Dixie magnetos were fitted to the Fiat engine of the S.I.A. aeroplane used in the recent non-stop flight from Turin to London.

CAUDRON RECREATION.

On Saturday, October 13th, a sports ground, provided by the British Caudron Co., Ltd., for the use of their employees, was formally opened by Sir William Ramsay. The ground is situated off Preston Road, Wembley.

To celebrate the event the firm's football team played a match against the Aircraft Manufacturing Co.'s Second Division of London Munitions League team.



(Photograph by F. N. Birkett.)

At the opening of the British Caudron Company's Recreation Ground. Sir William Ramsay (in centre), the Directors of the Company, and the Chiefs of the Staff.

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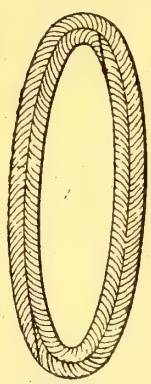
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(*Continued from page 1100.*)

Capt. R. G. H. Pixley, M.C., attd. R.F.C., who was reported missing on June 4th. News will be gratefully received by Maj. Pixley, Maybury Knowle, Woking.

* * *

If any officer or man can give any information, or if relatives of prisoners of war in Germany would ask for news of Lt. A. J. C. E. Phillippo, pilot, R.F.C., who was reported missing on June 7th, the same would be gratefully received by Mrs. Phillippo, 6, Woodville Road, Bexhill-on-Sea.

* * *

During a flight by a number of British aeroplanes over London on Oct. 8th, one of the machines developed engine trouble, and the pilot, after gliding several thousand feet, made a forced descent on Parliament Hill Fields. The machine was badly damaged, but the pilot, Lieut. Gordon McNeil, escaped with cuts and bruises.

[Incidentally, the spectacle of British aeroplanes over London created something of a sensation in certain over-populated districts of the town.—Ed.]

FRANCE.

Official Communiqués.

Oct. 9th.—Our air service, in spite of the wind, which was blowing a gale, co-operated actively in the attack, turning their machine-guns from a low altitude on the enemy infantry, and keeping touch with other arms.

Oct. 11th.—Lieut. Boyau brought down his 10th enemy machine on October 1st.

Oct. 15th.—In the region of the plateaux between Ailles and Craonne the artillery activity was violent during the day. There were patrol encounters in Champagne West of Auberive. There was an intermittent cannonade on the rest of the front. Two German captive balloons were brought down to-day, one by the fire of our special guns, the other by one of our aviators.—Reuter.

Oct. 15th.—German aviators bombarded the Dunkirk region last night. There were several victims among the civil population.

Two German captive balloons were brought down to-day, one by the fire of our special guns, the other by one of our aviators.

* * *

A report from Paris on Oct. 15th gives some details of the aerial engagements in which the death of Capt. Guynemer was avenged by one of his comrades, Lt. Fonck, have been made known. On Sept. 30th Fonck was flying at a height of 7,000 ft. when he was attacked by a German two-seater piloted by Wissemann, the German who shot down Guynemer. Fonck escaped the first rush by clever manœuvring, got behind the German machine, and opened fire from below. Wissemann was shot through the head, fell out of the aeroplane, and dropped to the ground. The observer was also killed. Fonck is officially credited with 15 victims, five of which were shot down in six days.

GERMANY.

Official Communiqué

Oct. 11th.—The losses sustained by the enemy aerial forces in September on the German fronts amount to 22 captive balloons and 274 aeroplanes, of which 167 were behind our lines. The remainder were seen to have been brought down beyond the enemy positions.

In encounters we lost 82 aeroplanes and five captive balloons.

In an aerial battle which developed in the evening over Zonnebeke-Zandvoorde, in which about 80 aeroplanes participated, three enemy aviators were shot down.

RUSSIA.

Official Communiqués.

Oct. 10th, Baltic Sea.—Also on October 8th, 14 enemy aeroplanes approached Tserel (southern end of the island of Oesel); some of them fired bombs on our transports at Ajtchod.

On October 9th, at 7 a.m., eight enemy aeroplanes attacked without result the batteries of Tserel and the village of Mento, six miles north-east of Tserel.

On October 8th our machines dropped 20 bombs on the Rodenpois Station (on the Riga-Petrograd railway) and on one of the Riga stations.

The aviator, Captain Brusilovitch, brought down an enemy aeroplane in the Hintzenberg sector, in the Riga region.

In the Buczacz region (Galicia) the French aviators Lakman and Codourier brought down an enemy machine in flames.

Oct. 13th.—In the region of the Gulf of Riga the enemy has made several air raids.

On October 10th nine enemy aircraft dropped 23 bombs in the region of Tserel (southern end of Oesel Island) and on our transports. One of the transport steamers was slightly damaged. Our avitaors, by a daring attack, dispersed the enemy machines and drove two of them into the sea.

Oct. 14th.—During the numerous aerial reconnaissances and engagements in the region of Oesel Island our aviator Galaktionoff brought down an enemy aeroplane, which fell to the ground.

Oct. 15th.—On the Northern front our aviator Captain Kossovsky brought down an enemy single-seater, which fell to earth south-west of the Kronberg Manor.

ITALY.

Official Communiqué:

Oct. 14th.—Yesterday, about 4.30 p.m., our seaplanes successfully bombarded several enemy destroyers sailing near the Istrian coast. A violent explosion was observed on board one of them.

* * *

Without, of course, being rash enough to prophesy as to the first crossing of the Atlantic, via the aerial way, one can perhaps venture to point out some pros and cons bearing on the report from America, which naturally is hopefully echoed in the Italian Press. Apart from the share of Chris. T. Columbus in that country's past, Italy has considerable interest in the U.S., and would hail the prospect of being the first nation to bring it nearer to her own part of the world.

One, however, scarcely sees the suitability of any of the present types of "CA's" for the purpose, though possibly an amphibian with the same weight-carrying propensities might be, or may have been, evolved to fill the bill. Something faster seems desirable unless trust in the prevailing wind is being relied on. While on the subject it is well to remind oneself that war has not increased the radius of action of aeroplanes, on the contrary, and very distinctly so.

With the immense increase of horse-power has come corresponding increase in fuel tanks. It is probable that to equal the pre-war duration flights with a modern 'bus something of a tank-ship body would have to be designed. Better results might be obtained if some attempt were made—at any rate, on the later fast Italian machines—to pay some slight regard to streamline in the designing of the nacelles and (fixed) motor cowls.

Examination of any of the few illustrations going round would horrify a designer of 1914. If there is anything in streamlining, can it be ignored in war-time? If the engine must be put in a square box bristling with excrescences, might not the whole affair be enclosed in a light non-metal cowl, which might incidentally be a protection to the engine, or be, say, of some bullet-proof material. As it is, machines are getting to look horrible. A point in the "reprisal" scheme?

* * *

Details of the great surprise raid undertaken a few days ago by an Italian air squadron upon the Austrian naval base at Cattaro have been received from the Italian Headquarters. The objective of the raid, which took place on the night of the 4th inst., is—like Pola—one of the largest Austrian naval bases. The central portion of the harbour with regard to the long stretches of Adriatic coast is specially adapted, now that the largest Austrian ships are behind their protecting nets, as a refuge and harbour for the enemy submarines and destroyers which operate in the lower Adriatic.

The chief objectives of the Italian air squadron were spread between Port Rose, an important submarine base with factories and supply depots, and the coast zone to the east of Castelnuovo del Canale and of Kumbar, which is crossed by the only railway in the Cattaro region. This is filled with supply depots, magazines, arsenals, and barracks.

The Italian squadron set out on a clear night, but when over the sea ran into a dense fog, which prevented the pilots taking advantage of the signals which they were to receive from Italian destroyers. The Italian pilots, however, so successfully navigated their machines that all arrived over Cattaro absolutely unsuspected by the enemy. Bombs were dropped on the submarine, destroyer, and seaplane stations, while depots and sheds were also hit with good results. At Kumbar a petrol depot was set on fire, while the sheds round the port of Gjenovitch were also set alight. A desultory and ineffective fire was made by the enemy, but none of the Italian machines was damaged, and all returned safely to their bases after a flight of four hundred kilometres over the sea and in a dense fog.

* * *

Signor D'Annunzio, the Italian poet, has received his fourth medal for bravery, in recognition of his services during the air raid on Cattaro.

* * *

An extraordinarily long "Stefani," dealing with the "CA" raid on Cattaro of the 4th inst., points out that the great expanse of water in the Bay rendered the work of destruction doubly difficult, as every one of the objectives of the raid was at a distance from all the others. Happily, the enemy seems to have been sleeping the sleep of the over-confident, and to have been unable to shake its effects off in time to do the bombers any harm.

* * *

Dealing with other aerial operations, "Stefani" says: Mention, too, must be made of the other minor but brilliant victories obtained by our pilots in the daily engagements at the Front. From Sept. 24th, 1917, to Oct. 3rd, six enemy 'planes were brought down, and two were obliged to land. On Sept. 24th, Serjt. Pennella brought down a "hunter" near Zagorje. On

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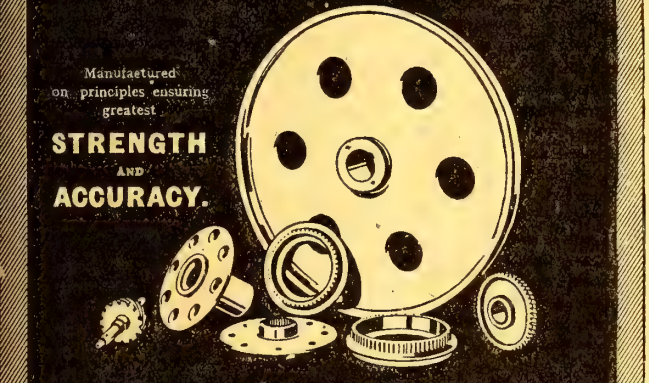
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the 26th, over the Sette Comuni Plateau, an explorer and the "hunter" escorting him were attacked by our 'planes. The former fell in flames at Asiago to Serjt. Imolesi, the latter was obliged to land towards Cima Dodici owing to the efforts of the same, Imolesi and Lt. Mazzini. On the 26th, too, the Serjts. Aliperta and Ferranti brought down an enemy near St. Lucia Tolmino. On the 29th, an explorer, shot down by Lts. Sabelli—[Our old friend Giovanni, of Brooklands.—Ed.]—and Paryis, fell behind our lines near the Pietra Rossa Lake.

Three consecutive successes were obtained by Major Piccio during the same period. On Sept. 26th he brought an enemy smashing down on the Ternova Plateau. On the 2nd he brought down another, in flames, among our lines near Auzza, and on the 3rd he obliged the third to land in our lines Mesmial way.

So Major Piccio scores 15 victories, Lt. Sabelli scores 5 victories, and Serjt. Imolesi scores 3 victories.—T. S. Harvey.

RUMANIA.

Official Communiqué

Oct. 12th.—Four enemy aviators bombed the city of Galatz, and, descending to a very low altitude, fired with their machine-guns, causing a number of victims among the population.

GREECE.

Lieut.-Commander Aristide Moraïtinis, Royal Greek Navy, attd. R.N.A.S., Eastern Mediterranean, and brother to Mrs. Cecil Pilcher, has been awarded the D.S.O.

* * * *

Athens, Oct. 14th. Delayed.—General Haralambis, the Chief of the General Staff, confirmed before the Parliamentary Commission of Enquiry the report that a German aeroplane had landed at Larissa in January, 1917, bringing Colonel von Falkenhausen, who came to confer with General Haralambis on the military situation in Greece. Colonel von Falkenhausen communicated by telephone with the Royal Palace and afterwards left again by aeroplane. Although the affair had already become known and had been reported in the newspapers, the statement has made a strong impression.—Reuter.

U.S.A.

Mr. Godfrey L. Cabot, President of the Aero Club of New England, and a Vice-President of the Aero Club of America, has put $30,000 at the disposal of Rear-Admiral Bradley A. Fiske, U.S.N., retired, the inventor of the torpedoplane, for the development of a craft capable of carrying and launching a full-sized torpedo, the weight of which is 2,000 lbs.

In announcing his gift Mr. Cabot said he was convinced the torpedoplane offered the only apparent means of destroying the German fleet, which, in Kiel and Wilhelmshaven, is protected from attack by other war vessels, rows of mines and shore batteries. Mr. Cabot intimated also that if $30,000 were not enough for the purpose he would enlarge his contribution.

AUSTRALIA.

It is reported that three Federal aeroplanes have performed a flight over Melbourne, dropping leaflets advertising the Liberty War Loan.

THE DEATH OF STANLEY COWNIE.

It is with great regret that one records the death of Mr. Stanley Cownie, who was accidentally killed while flying on Oct. 13th. Mr. Cownie was the chief instructor at the Beatty school, and had been remarkably successful in turning out first-class pilots for the R.F.C.

One gathers that Mr. Cownie was flying a small tractor biplane, and put the machine into a voluntary spin at an extremely low altitude. Unfortunately, there was not sufficient room for him to pull the machine out, and it struck the ground almost vertically, killing the pilot instantly.

Stanley Cownie, who was born on June 2nd, 1897, in London, took his certificate, No. 3324, on Aug. 8th, 1916, at the Hall School, on a Hall biplane. He was immensely popular with all who came in touch with him, and was a very able instructor. As a rule, he was a careful and steady pilot, though as clever in handling a machine as any. On can only imagine that in the exuberance of a moment he took a risk which normally he would not have taken, and that his luck was against him.

At the inquest held on Oct. 15th, evidence was given that at a height of about 500 ft. he commenced to spin, failing to realise that he was at such a low altitude. The machine crashed to the ground, the pilot's skull being fractured.

Mr. G. W. Beatty said the deceased was an experienced pilot instructor, but this was the first time he had attempted to spin. Witness had advised him that before doing so his machine should be at a considerable height, so as to allow for a nose-dive afterwards. He thought there was an error of judgment.

The jury returned a verdict of "Accidental death."

All will sympathise deeply with his relatives, and also with Mr. George W. Beatty, who had the greatest regard for Mr. Cownie, and considered him as quite one of the pilots of the future, as well as being an excellent instructor, despite his youth. The accident is naturally a great blow to all concerned with the Beatty School, which has hitherto enjoyed remarkable immunity from serious accidents of any kind, although a very large number of pilots have been produced.

SIGNOR CAPRONI'S VIEWS.

A Reuter telegram from Paris says:—

The "Petit Parisien" of Oct. 10th prints an interview with Signor Caproni, the inventor of the famous aeroplane bearing his name. Signor Caproni states that the present war is essentially a war of *matériel*, and it is highly necessary that the enemy production should be curtailed. This can be done. Thanks to the great strides made in aviation it is easy to imagine a powerful attacking force of three hundred large biplanes, each one capable of dropping one to two thousand kilogrammes of explosives on Essen, Pola, or Vienna.

On the subject of submarines, Signor Caproni said that the methods used by the Allies were not quite up to the task they had to perform. A man does not destroy a swarm of wasps by attacking them separately, but by smoking out the wasps' nest. In the same way, in order to get rid of the submarines, we must destroy their bases. Squadrons of aeroplanes paying regular visits to these bases would soon bring about a marked reduction in the submarine fleet. So, too, if by continued bombardments they compelled the enemy's aviation centres to withdraw farther from the front, they would secure greater freedom from attack on our own front.

Signor Caproni is of opinion that too much importance is attached to duels in the air, while too little stress is laid on raids against enemy bases. The Allies, he added, ought to have in the near future a fleet of two to three hundred big bombing aeroplanes, capable of carrying two thousand kilogrammes of explosives apiece, to be used for the destruction of enemy factories, bridges, naval bases, etcetera.

[With which sentiments Mr. Handley Page and other advocates of big aeroplanes will agree. But why 200 instead of 2,000?—Ed.]

EAST ISLINGTON.

Both the friends and enemies of Mr. Pemberton-Billing will learn with interest that it is the intention of the Society of Vigilantes, of which he is the founder and moving spirit, to put up a Vigilante candidate for the seat for East Islington, rendered vacant by the death of Mr. Radford.

Whatever may be Mr. Billing's faults, and he has as many as most human beings, lack of loyalty to the British Empire and lack of earnestness for the causes which he has championed are not among them, so an interesting three-cornered fight may be expected, seeing that the Coalition and the new National Party are both putting up candidates, and consequently all three competing parties will stand for Imperialism. Two at least—the Vigilantes and the Nationalists—will stand for Purity in Politics, and probably two—the Vigilantes and the Coalitionists—will stand for an Imperial Air Service, seeing that the Government has now accepted the I.A.S. in theory.

The name of the Vigilante candidate is not announced at the moment of writing, but, judging by the accounts published in the "Imperialist," the official organ of the Vigilantes, there is not likely to be much difficulty in finding a candidate, nor any lack of funds to fight the election.

There is no doubt that as the leader of the Vigilante movement Mr. Billing has now an excellent opportunity of emphasising the soundness of the changes which he has advocated in the past two years, even though the manner of his advocacy may have displeased some of his erstwhile supporters. The recent raids on London make the matter of aerial defence of as great importance in this election as at the time of Mile End and East Herts, only the circumstances are very different. In those days Mr. Billing was a voice crying in the wilderness, to-day he has everyone, even the political opponents of the Vigilante candidate, in entire agreement with him. So great has been the change that we even find Mr. Billing and General Henderson both working in their respective ways for a great Imperial Air Service.

There is no fault to be found with the intentions of those now responsible for the production and use of our aircraft, and such troubles as may seem to provide grounds for complaint are legacies from a previous régime, which troubles could not possibly be put right in weeks or even months. It is, therefore, to be hoped that in his support of the Vigilante candidate Mr. Billing will confine his criticisms on aerial matters rather to what might have been done in the past than to anything which may be in process of being done at present. An announced intention to support the Government in its present intention of well-doing in things aerial will certainly win the Vigilante candidate more votes than will wholesale condemnation of everything Governmental, simply because it happens to pertain to the Government.

A very much bigger air fleet is needed, and we are in a fair way to get it. East Islington will doubtless vote for a big air fleet, and every vote recorded on such grounds will confirm the justice of the agitations of the past. It remains to be seen, therefore, whether the free and independent voter will vote for what the Coalition candidate promises in this direction, or for what the Nationalist candidate promises that he will press the Government to do, or for what the Vigilante candidate promises that he will jolly well see the Government does, or know the reason why.

At any rate, the Vigilante candidate will have one great advantage, in that having had no political past he will have nothing to recant, and so will be less easy to heckle than the others.

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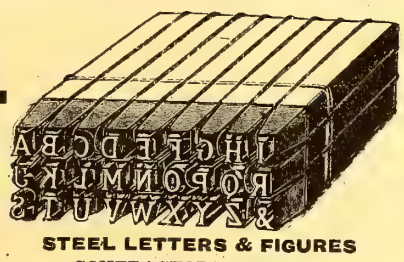


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AERIAL ALLOTMENTS.

[The following article has nothing to do with the food question, beyond the fact that it may indicate how some people earn the money that buys their food, and how the nation's money is spent. Whoever wrote it presumably knows what he is writing about, but the Editor takes no responsibility in case any of the matters mentioned may bear some resemblance to facts. The Editor cannot guarantee, however, that the whole article is one elaborate lie.]

Aeronautical Transitorial Directorate,
Allocatory Department,
Military Antics Office,
Blighty, N.W.

Any further communication on the subject should be addressed to the Director-General of Allotments, and the following reference quoted, 300259/Perplexity/Q.E.D.

Gentlemen,—With reference to the allocation and dispatch of machines from your works, I am to inform you that all existing instructions are hereby cancelled, and the instructions contained herein are to be followed in the future.

It should be noted that this cancellation does not affect any outstanding allocatory instructions affecting machines that have already been dispatched, and according to usual departmental procedure, it is not likely to affect their dispatch in the future either.

Applications for allocation of machines (a) with engines, (b) without engines, should be made to the examiner I/C stationed at your works at least one calendar month before the machine is ready for dispatch, in order that the necessary departmental procedure may be followed out through the necessary official channels.

In order that there may be as little delay as possible, this department has been placed under the direction of an experienced Allocatory Director Assistant Deputy General, viz., Professor Minus Halfit, the well known geologist and eminent golfer, whose handicap now stands at + 1, who has, with the approval of this department, added the following technical terms to the A.G.S. lists, to prevent any ambiguity on the subject.

ALLOCATE—To place, to distribute, to give everyone his share after the job is finished.

ALLOCATION—Act of assigning or alloting something you don't require.

ALLOTTEE—One to whom a share is alloted of material someone else is waiting for.

ALLOTMENT—A portion of the earth's surface, the upper stratum of which consists of old boots, empty tins, builders' refuse, and a little soil, which, if not exactly an ideal compost for growing exhibition crops of vegetables, makes an excellent necropolis for dud aeroplane fittings.

ALLOCATORISMS.

All machines without engines for which Allotmentary Instructions have not been received are to be delivered Somewhere, the official whereabouts of which will be forwarded to the A.I.D. headquarters.

Any machines which may have had engines fitted previous to receipt of this notification, must have them taken out again, in conformity with the foregoing paragraph.

In order to prevent congestion and confusion at your works, which might possibly occur through insufficient engines being available for fitting into machines for which engines are not to hand (see also previous paragraphs), and which may not otherwise have been assigned allotment, may, if there are no vacant skating rinks, Zoos, or other suitable buildings allotted for this purpose in your vicinity, be dispatched into store, the procedure set out in Paragraph I being followed to obtain the necessary allotmentary information.

Upon notification that a machine has been allotted into store, the contractor should communicate with the Officer Commanding Central Aircraft Fitting Department, Room 927 (Telephone Hopping 7634XOI), and obtain from the Director-General of Removals, the necessary forms for daily movements of packing cases, which must be filled in according to the instructions printed on the back, and forwarded to the Central Repair Depot, and obtain from the Equipment Officer there the address to which the (a) engine, (b) machine, (c) either, (d) both, (e) details, (f) spares, (g) packing-case, (1) type "A," (2) type "B," is to be sent, and whether the machines are to be sent totally dismantled, packed in cases, dispatched in scenery trucks, sent per road in furniture vans, or sent per parcels post (see Post Office Regulations for size, limits and weight).

Any machine for which a spare engine is available, and for which allotment has not been received, should be dispatched to the aerodrome most difficult of access, and which entails the longest and most expensive railway journey from your factory.

In following out these instructions, contractors may find that occasionally there may be some Slight delay between the Completion of a machine and its final allocation, and the Aeronautical Flitterate wish to point out that although it is of the utmost importance that the output of machines should be as great as possible, it is most imperative that these instructions should be implicitly carried out, and in order to reduce any delay to a minimum, the following explanatory memorandum on dispatching machines and spares has been compiled by the Central Aircraft Allocaterate for the use of contractors.

DISPATCHING.

Spares.—From an official standpoint, these are a necessary evil, although there are indications in the various reports submitted to headquarters that, from the contractors' point of view, they are an unmitigated nuisance.

Being somewhat of a ubiquitous nature, and the supply being regulated by the demand, like extras at a dance, contractors may find it difficult at times to know whence they come or whither they go, and, therefore, it is pointed out, that if they do not wish to be caught bending, they must follow implicitly the Allotmentary Instructions given herewith.

Wings.—These will be dispatched according to instructions, in complete sets when you can get them, or on the instalment system, which seems more popular, complete to their respective schedules, i.e., if the contractor can assemble, pack, and dispatch a given set in the interval between any two consecutive deliveries of letters from headquarters, plus alterations, notifications, amendments, etc., with the class 1 job thrown in as a star turn. As wings are over the size limit for parcels post, it has been found necessary to pack them for dispatch in what are known as sets, "A," "B," "C," etc., in rectangular cases made of timber, which, when assembled, are easily recognised by their similarity to a large box.

Packing.—As there appears to be considerable dubiety amongst the experts as to the moisture resisting properties of dope, it has been decided to cover the cases on the inside surface with an approved waterproof paper, which must fulfil the following conditions:—

The paper, of an approved width and weight per square foot, must first be coated with "Tarareo," which can be obtained from the R.A.F., who will also issue instructions for its application. After the paper has been evenly coated, a layer of coarse mesh flimsy linen is to be evenly spread over the Tarareoed surface to reinforce it, and, after being thoroughly dried, it must be tested as to its moisture resisting properties by fixing a portion to a stoutly-built wooden frame, 2.57 in. by 2.604 in. over all, made of 3.92 in. by 1.76 in. specially selected silver spruce. The paper must be fixed to the edges of the frame by $\frac{3}{8}$ in. tinned tacks with flat heads, 0.701 in. diameter, spaced 2.507 in. centres, the tacks to be passed by the A.I.D. on a 10 per cent. basis and a lead seal with W∧D stamp to be affixed to each packet.

The frame thus prepared is to be placed at the base of some building, not less than six stories in height, with the covered surface uppermost, supported at each corner by wooden blocks 1.749 in. deep.

A section 17 man will then ascend to the roof with a two-gallon water-can, fitted with a special rose, which will be supplied by the Atmospherical Research Waterate, acting on instructions from the M.B.2 Meteorological Statisticate, who will specify the diameter and spacing of the holes therein in accordance with the average rainfall for that particular district.

The examiner, after duly noting the time of day, date, direction and velocity of the wind, and whether dull, cloudy or overcast, will proceed to tilt the water-can to such an angle as will project the water in a steady flow onto the covered frame below, at the same time oscillating the can and making a gentle noise through his teeth like rain.

When the two gallons of water, which must be of 1.001 specific gravity, have been projected onto the frame, that latter must be carefully examined on the under surface for any dampness, and, if found to be perfectly free from any signs of moisture, a 56-lb. weight is to be placed in the centre of the frame, on the paper, and note taken as to the tightening properties and tenacity of the latter as it dries. If, in the opinion of the examiner I/C, the tests have been satisfactory, he is empowered to stamp it every 12 inches without sending any test pieces to the M.B.2 department for further expert opinion. The W.P. paper, as now approved, is to be applied on the inner surface of the packing-case horizontally, with the seams towards the centre of the case, and fixed with similar tacks and spacing as used in the test frame.

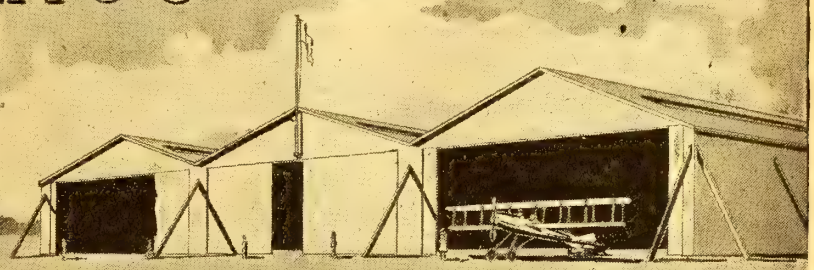
After contractors' probationary period with complete machines, the actual packing of the wings will be comparatively simple, but before the lid is put on the case, two very important items of official procedure must be carried out: (A) the inspection and release note must be made out in sextuplate, according to instructions contained in my letter, 9716/Multiplicity/A.E.R.O.—2S., Dy. It will be noticed that these copies are to be reproduced by the use of carbon tissues, and they will, therefore, be "Exact Duplicates," and, starting with the top copy, they will officially be known as Nos. 1, 2, 3, 4, 5, 6, etc.

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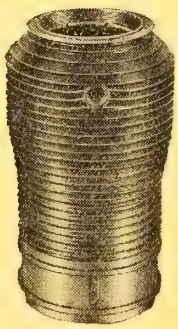


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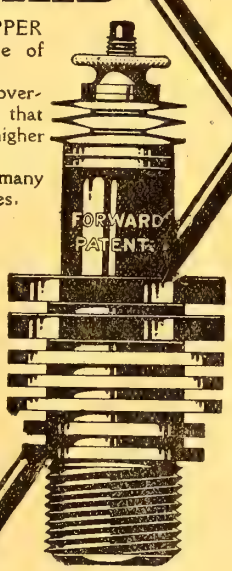
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(B) As there is considerable divergence of expert opinion as to the best position for the packing note in the case, in order to obtain uniformity of procedure, the Interim Assistant Deputy-General Controller Packing Case Inspectorate instructs me to inform you that if there remains the slightest shred of doubt as to your capabilities of coherent thought, the following epistleatory premium on your intelligence should for once and for all dispel it.

Telegrams "Hopeless,"
Aeronautical Wandered Department,
Mentality House,
Luney Circus, N.S.E.W.

Sir,—In view of the fact that Release Notes have been occasionally returned unopened in the material in which they have been packed, it is considered advisable to place them where they are least likely to be found.

As this procedure has been adopted very successfully by Messrs. Ideas and Thinks, Ltd., it is suggested that the proceeding could be followed with advantage by other contractors.

As it is possible that a case may be opened backside foremost, or upside down, careful search should be made for the Release Note both inside and out, and in order to facilitate this, a special War Bonus should be granted to those employees who, owing to a well-spent youth, are able to walk on their hands, and, in addition, an acrobatic badge is to be issued to those who have acquired inverted dexterity with their feet.

(Signed) Houdini Blondin,
Captain and Acting Adjutant,

PACKING CASES.

Under normal conditions when dispatching machines by rail, whether completely, partially or totally dismantled, a packing case will be necessary, so for this purpose and for use as scratching houses, store rooms, workshops, etc., thereafter, the R.A.F. issue plans for the construction of cases under A.I.D. inspection. The plans are covered with a full complement of details; but in order not to give useful information to the enemy the grain of the timber and the price of the case have been omitted, the former can be obtained from the wood expert, and the latter from the office boy I/C.

They are designed to give the maximum amount of perplexity with the minimum amount of utility, and their chief characteristics consist of a roof, floors, two ends, two sides, and six brass padlocks with 12 interchangeable keys. It will be noticed that although the metal connections generally are very light in construction, the padlocks are of the most expensive, double lever, sliding escutcheon, heavy brass type, and if they appear somewhat excessive for keeping honest persons from entering the cases, on the other hand, they stamp the whole caboodle with that unmistakable departmental *toute ensemblic* vapidity which entitles them to annex the latest creation in war pastry.

When applying for aeroplane packing-cases the contractor must fill in Army Requisition Form No. 705602 C, stating his definite requirements for a definite period for a definite output, which, owing to the regular and systematic receipt of material, is quite a simple matter, also stating in the respective columns, whether for nacelles or planes, or either, or both, and also type of case required, if assembled or dismantled, and, if the latter, whether the contractor prefers the correct parts, comprising the cases numbered accordingly, or whether, for the sake of variety and in order to increase output, he prefers them scientifically variegated, say, an L.B. bottom, G.X. sides, F. ends, P.B. roof, with a jumble box of connections and a "go as you please" bundle of posts.

It is pointed out that a combination of this sort provides considerable scope for display of individual ingenuity on the part of the erectors in their frantic endeavours to go one better than Euclid, by vainly trying to prove that "things which are unequal, are equal to one another."

Contractors' attention is drawn to the fact that, owing to the infallible official methods and the unlimited use of innumerable different kinds of forms (supplied in pads of 300), that whatever they do receive, it will not be what was asked for. But they will note that, whatever the type, quantity, quality or condition of cases they do eventually receive, unless receipt of same is acknowledged on the special forms of "Periodical Rambles of Packing-cases on Hire," they must officially understand that they have "NOT" received them, and the A.I.D. Section 3 Inspectorate cannot pass the packing of a machine however efficient, in a case that officially the contractor does not possess.

Although you may have hitherto packed and dispatched a hundred or two machines successfully without any expertorate assistance, it appears that, according to procedure in fashion at the moment, in applied packingetics your education has been sadly neglected, hence the A.I.D. have had to evolve a new form of frightfulness to wit, the Aeronautical Pactorate, whose procedure promises to be as wonderful as the working of a half-crown watch, for no matter how expert a contractor may be at home after work hours on a flitting day, the consensus of opaque and translucent conferencial opinion seems to be that in the science of packingetics your right hand knoweth not what your left doeth, and, therefore, you must render unto Cæsar the things which he spends 75 per cent. of his time filling in forms to convince you are his, by informing him periodically when a machine is ready for internment under Section Something Inspectoration, upon completion of which he must transmit to the Aeronautical Pactorate a sworn statement enumerating the following packingosities, stating which of the following official methods of placing the machine in the case is adopted:—

(a) Dismantle the machine and pass it through the small door.

(b) Remove the brass padlocks and give the machine a state entry through the front (?) end.

(c) Or vice versa through the rear (?) end, or

(d) Lift the case bodily up minus its floor, enthrone the machine on the latter, and then lower the case down over the machine again, the main desire by this time being to bury it, if not out of mind, at least, out of sight as quickly as possible.

(e) Whether the machine is packed upside down or inverted.

(f) Backside forward or 'tother way round.

(g) On its nose or on its tail.

(h) Whether it is packed at all or slung to the roof in order that the Transport Officer may creep underneath it when searching for the Packing Note.

(i) If by any or all of the methods detailed in Clauses (e) to (h).

(j) State the number of packers, giving their size, weight, religion, and whether married or single.

(k) The width, thickness, texture, pattern, degree of visibility, weight per foot, number of yards in a roll, and how many rolls are contained in a bundle of girth web as used.

(l) Size, gauge, number and colour of clout nails, stating how many to the pound, and, if annealed, state whether held in the packer's mouth during use, and if so, has he, she or they (1) natural, (2) false, (3) or no teeth at all, and to what extent items 1, 2 or 3 affect the total number driven in per minute: (1) with the face, (2) the pane, (3) handle of the hammer, or other percussive tool.

(m) The general state of the atmosphere inside the case during packing under your inspectorate, whether normal, azure tinted or sulphurous, and how far any of these conditions are incidental to (1) viscosity of the dope, (2) acute inspectoration, (3) or lack of betting news.

(n to z) These are to be filled in as required after each postal delivery, according to the new daily procedure instructions, any extra procedure stunt will be communicatel by wire, and, therefore, it is suggested that in order to save time, packers should not start work until the day after,

TRANSPORT.

After the case is on the lorry, the examiner must report on the transport appliances, viz., if the fastening is by chain, state whether new or second-hand, or if rope is used, whether Manila, hemp, or ham twine, and, if the latter, state the number of strands proposed, and forwarding a 12-in. length for test.

The wheels must be carefully examined to see that the tyres are not worn beyond the limit allowed on the plan, and that the grease used on the axles is sufficient in quantity and quality for the purpose for which it is intended, and that it contains not less than 74.990 per cent. of lubricating fats, taking one and fourpenny margarine as a standard.

The examiner must also see that the nails in the horse's shoes are quite sound, as it is of the utmost importance that no delay should occur between the factory and the station. He must also carefully note whether its tail has been properly combed out, and state the exact shade of ribbon used to tie it up, and whether purchased at a bargain counter with a Class A Certificate, or through the Ministry of Munitions.

Finally, he must examine the horse's teeth most thoroughly, at the same time noting whether its nose-bag is placed on the floor, or on an obsolete pilot's cupboard, when having its one and threepenny lunch, exclusive of water.

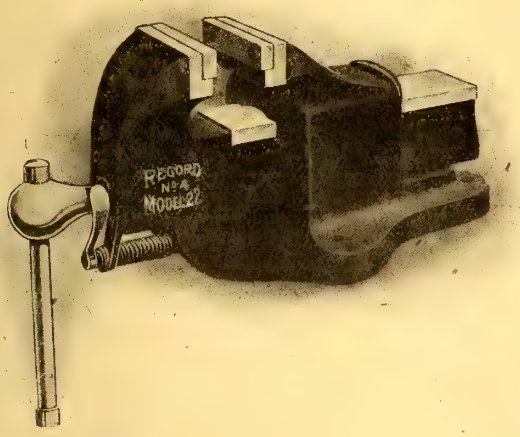
As the position and general effect of the address is a matter of supreme importance, the attention of examiners is called to the following notification.

Aeronautical Stencilate,
Ref. 3.Q/Smudge/A.Y., Vandyke House,
Memorandum for Contractors. Room 937.

Sir,—I am instructed by the Deputy Assistant Director-General of Perigrination to inform you that, when a contractor is instructed to pack aeroplanes for immediate dispatch Somewhere, the markings on the case should be imprinted in the position indicated by the Chief Controller, Aeronautical Stencilate, who will forward sample of lettering, figures, etc., giving dimensions, schemes of colouring, shading, and whether Old English, block, Roman or other approved style as may be directed.

It is very important that the said markings should be in position readily seen by the Transport Officer, and I am requested to draw your attention to the fact that, according to instructions,

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he is not provided with a fire escape, nor has he undergone any special training as an acrobat or contortionist, and, therefore, the address must not be put on the roof or under the floor.

The address is to be affixed with approved tacks, see A.G.S. 1005/x, spaced 29.31 diameters apart, C to C, its position checked and the WAD stamp imprinted in a conspicuous place, say, across the address.

For Officer Commanding Central Hieroglyphic Splatherate,
Rowney McGuilp, Colonel.

As the machine is passing through the doorway the examiner I/C will inform you that he has just received a wire from headquarters informing him that "The present wing nuts on the clips of the oil tank drain-pipe, leave a distinct impression on the pilot's suede gloves, and that, in order to obviate this, a new pattern is being adopted, but as it is a Class 1 job, he can't release the machine until the new nut comes through."

A.G.S. Additions.

In order to neutralise little contretemps of this sort, the Aeronautical Chaplinate are having a comprehensive list of expletives and texts added to the A.G.S. lists, suitable for use at psychological moments like this, in order to avoid any further serious dilution of labour owing to sudden shock.

* * *

In the phraseology of the modern novel, the asterisks denote that some little time has elapsed.

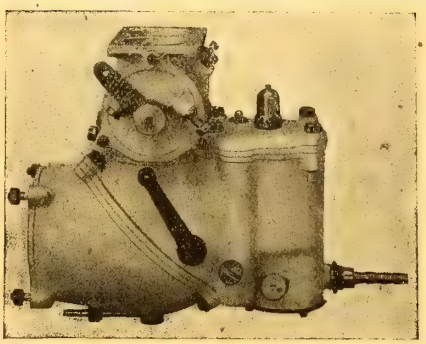
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As you slip for a few brief seconds into the realm of unconsciousness, where the A.I.D. cease from troubling, and Headquarters are having a rest, you realise that, verily, the PEN is mightier than the Sword, and, moreover, that DEPARTMENTALLY, WE ARE A GREAT NATION.



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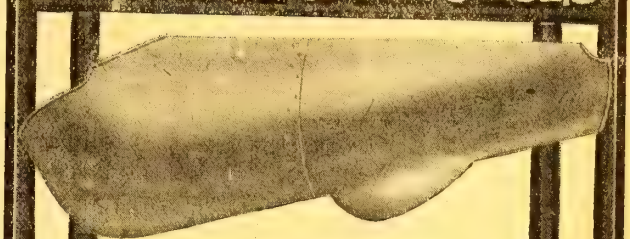
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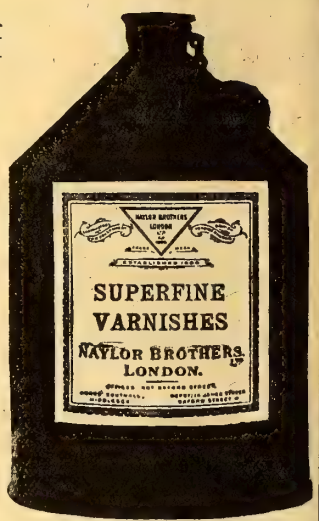
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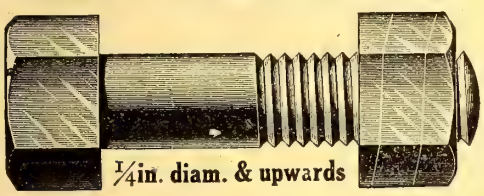
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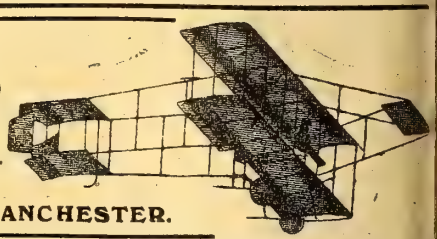
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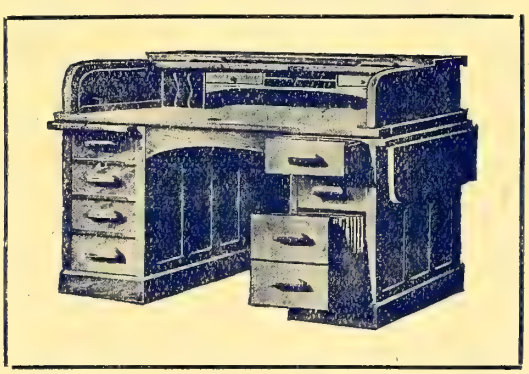
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ON MORE AND MORE AND STILL MORE—II.

Germany's latest politico-strategic move in the development of aerial warfare is to flood the world's Press with accounts of what the German Air Service is going to do in the Spring of 1918. These stories come both from neutral countries and from the actual fighting-front by way of prisoners and, presumably, our Intelligence Department. Doubtless there will be a tendency in some quarters to put the whole thing down as a bluff, but it is well to remember that, whenever Germany has put up a bluff of a similar nature before, as, for example, in the matter of submarines and of Zeppelins, the reality has come within measurable distance of the promises, and has only been adequately met after strenuous efforts on our part, and much unnecessary loss and discomfort owing to delays in our counter-preparations.

The Reuter message from G.H.Q. in France, published widely last week in the daily Press, and reproduced with brief comments at the end of these notes, gives an indication of the line of Germany's preparations. To meet the German threats implied in that message, which has obviously been sent with the approval, and the assistance on technical points, of G.H.Q. Staff, it is necessary for all concerned with the output of aircraft in this country to put forth their best efforts during the next five or six months. If the Flying Services are to beat the German offensive with a stronger counter-offensive, they can only do so if they lavishly supplied with the most up-to-date aeroplanes, as Sir Douglas Haig himself pointed out emphatically in his dispatch at the end of last year. And we must satisfy the demand for more and more and still more aeroplanes, of which Lord Cowdray spoke.

The Mastery in the Air.

The maintenance of "the mastery in the air"—the phrase is Sir Douglas Haig's, although Major Baird scoffed at it afterwards—depends on the masters and men in the aircraft factories in this country, and I would earnestly beg the chiefs of all aircraft works to impress this fact on their employees. The war in the air must be won in the workshops of England—or Scotland, as the case may be. The best insurance against bomb raids is a bigger output of British aeroplanes of war. To stop the Hun from coming to this country we must stop him where he starts.

If we were Americans we should have a whole string of such aphorisms printed in large letters and stuck up all round our factories. The Americans are great on driving home essential facts in such ways, as for example the famous warning in the tool-store of a factory which reads: "The Lord helps those who help themselves; but the Lord help anyone found helping himself here." Or the equally famous warning at the doors of a goods-lift: "Workers are earnestly requested not to fall down the elevator." Little as I believe in posters, and contemptible as have been the official efforts to encourage recruiting, food saving, subscribing to war loans, and so forth, by means of vulgar, bathetic, puerile, or sickly-sentimental posters, I do believe that a series of short, pithy sentences, driving home the need for more and more aeroplanes, if fixed prominently in aeroplane factories would stir the aeroplane workers to further efforts—especially if it were made perfectly clear that they themselves rather than the soldiers in the fighting line would suffer if output were not increased very greatly.

Self-preservation is the first law of nature, and the worst slacker will work like a nigger if he once understands that his safety depends on his output. More aeroplane raids will certainly take place before long, and I hope that factory managers will use the opportunity to point the moral that only the workpeople themselves can protect the workpeople. That is the one great fact that our poster-loving Governments have never impressed on the people.

National Aircraft Factories.

Meantime there are other matters concerned with output which deserve discussion. Recently, in the course of an argument on output, someone mentioned the idea of national aircraft factories, on the line of national shell factories. I have purposely avoided mentioning the subject to anyone who was likely to have any official knowledge of such an official intention, if it exists at all, for the good reason that any information so obtained would naturally prevent me from discussing the subject in print. Therefore I write without in the least knowing whether such national factories are under consideration or not. It is to be hoped that they are not.

National aircraft factories would, it is to be feared, prove a national danger. They would, in the natural course of affairs, have first call on all material and labour, which would mean curtailing the supplies of the established and successful firms in the aircraft industry. It is now, I believe, recognised officially that the best aeroplanes, both as regards aerodynamic and detail design, have been produced by the industry. Also it is known that "trade" firms beat official establishments as regards output, not only in aircraft, but in shipbuilding, gun making, ammunition making, and everything else pertaining to war material.

The Royal Aircraft Factory.

There is every reason for retaining the Royal Aircraft Factory as an experimental establishment, and even for increasing its output of certain machines, engines, and parts, because in the first capacity it acts as a useful pacemaker for the aircraft industry by producing new designs for the "trade" to beat, and in the second, if it is allowed to produce on an increased scale, so that its costs are reduced to something like a commercial

basis, it provides a kind of datum-line from which to judge "trade" prices for contracts.

The R.A.F. might, in fact, be used to even greater advantage than it is, by turning it on to produce experimental mechanisms of outside origin. For example, a new engine, or aeroplane, or accessory gadget, may be approved by the authorities concerned, and yet it may be impossible for the inventor or his backers to get it made, owing to all the firms capable of making it being already too full of work of their own to touch an experimental proposition. Such experimental work might well be carried out at the R.A.F. under the direct supervision of the inventor.

If the inventor or the owner of the invention happened to have money, or had good financial backing, he could pay for the work done, and the invention would remain his own and his partners' property, with which they would be free to trade with any firm in the aircraft industry or with the Government. If the inventor was unable to pay for the work, then, if it proved a success, the resultant product would be Government property, subject to a fair recompense to the inventor-designer, either in cash, royalties, or in the shape of a Government job concerned with his invention—or all three, or any two.

By some such arrangement much time could be saved which is now spent in hawking really valuable inventions round from firm to firm in the aircraft industry before one can be found to take them up. It must be recognised that only one invention in 10,000 is any use at all, and that only one in a hundred of the useful ones are of outstanding merit, but even so that one in a hundred thousand generally has to be hawked around nearly as long as if it were useless, and frequently the glib-tongued inventor, or the inventor with political pull, manages to get a useless invention taken up while a valuable invention is still on its peregrinations.

The Inventor-Squashing Department.

It might well be cheaper and quicker in the end to have a special department at the R.A.F. for the testing and squashing of inventions by actual proof than to have inventors continually bombarding busy technical people with the same invention over and over again, first through one department, then through another, then through the local M.P., then through some Government official or other. It might even be worth while to publish a list of the utterly impossible inventions which have been turned down time after time.

I could supply quite a nice little list from this office alone of people whom I have endeavoured to swat to prevent them from buzzing round Inventions Boards and suchlike long-suffering people. For instance, there is the gentleman who wants to fire shells loaded with sand at German raiders, so that the sand will "get into the bearings of the engines and wear them out." And there is the equally interesting gentleman who wants to fire shells loaded with asbestos fluff, so that the fluff will choke the gauze inlets to the carburettors. Some substitute carborundum for sand, as having greater cutting effect, and others substitute cotton for asbestos, as being cheaper. All forget that if it were possible to get their comic shells close enough to a raider to do him any harm at all, a common or garden high explosive shell would crumple him all up in one bang. And they further forget that if sufficient fluff or sand shells were fired to fill the air with the stuff, our own pursuit machines would have to fly through it as well as the Huns.

Now if all those gentlemen—and there are dozens of them—could be sent down to the R.A.F. to have their inventions tested under their own supervision, it might be possible to choke them quietly with their own sand or fluff, and they might then serve a useful purpose by increasing the output of the R.A.F. allotments. Many other inventors might be made similarly useful if turned loose to experiment at Government expense with their own ideas.

Real Usefulness.

That, however, is rather by the way. To be quite serious, the R.A.F. might well be used to an even greater extent in developing promising inventions. Incidentally the younger generation of aeroplane designers might with advantage make greater use of the R.A.F. than they do. I am told that under the present sympathetic régime every possible assistance is given to the authorised representatives of aircraft firms desiring the latest information on anything to do with the design of engines, aeroplanes, propellers, instruments, or anything else pertaining to aircraft. Here, again, I write without official information, and purely on the testimony of those who have asked for advice or help from the R.A.F. and have got it, promptly and courteously.

It is not likely that any stray inventor of new and weird wing-curves, or any young student of aeronautics filling in his spare time with a correspondence-school course, will at once have the secrets of the R.A.F. laid bare to him, but certainly every possible help seems to be given to aircraft manufacturers, and a friendly welcome is extended to any of their employees who are sent to the R.A.F. for information. It is hoped that this fact will be borne in mind by firms which have a desire to acquire knowledge now, with the idea of remaining in the aircraft industry after the war.

The Small Man's Uses.

However, to return to the subject of the output of to-day and to-morrow, another question of immediate importance is what can best be done with the small man or the small firm? There are hundreds, probably thousands, of workshops in the country all capable of turning out aircraft parts of one kind or another, and yet none capable of making a complete aeroplane or a complete engine. In the aggregate their man-power and machinery power is enormous, and we cannot afford to waste it. Yet individually they are negligible quantities.

At one time it seemed as if the Air Board intended to adopt a highly elaborated form of the French *système globale*, and to turn all these small men on to make parts, which would be delivered to a great central depot and then distributed to the assemblers of the complete article. Apparently this was a wrong impression, for, when one comes to think it over, the staff necessary to deal with such a system would be colossal.

It would work perfectly well if a large number of well-trained, intelligent business men were available, but practically all the men suitable for such an organisation are already fully employed, either in their own businesses or in important Government posts, where they have their hands full already with looking after untrained staffs of their own.

Sub-contracting.

Therefore the only workable way out seems to be to encourage the system of sub-contracting, as appears to be the official method at present. Where a firm has made good as a direct contractor with the Government, has successfully expanded its business, has increased its output in proportion to its surface expansion, has taken on the teaching and organising of small firms sub-contracting with it for parts, and has shown its ability to carry on its business in a businesslike way, there is good reason to suppose that such a firm can expand its operations still further. Therefore it seems sound policy to encourage that firm to develop its system of sub-contracts rather than to start opening up hundreds of fresh small accounts direct with small workshops.

The successful firm has already proved that it possesses organising ability, and therefore it seems wiser to rely on that organising ability to organise still greater output than to start up more and more offices full of untried officials. In other words it seems better to let the big and successful firms develop themselves into miniature Air Boards on their own accounts all over the country than to try to centralise all the detail control of every little workship in the country inside the Hotel Cecil. Therefore, if any of my readers who own small workshops are anxious to do aircraft work of any kind, I recommend them to tackle any of the big aircraft concerns in their neighbourhood and ask for sub-contracts, rather than worry to get direct Government orders.

The Better Proposition.

It is really a better proposition in the end for everyone concerned. Although there will certainly be a big and healthy market for aircraft after the war, especially if the Civil Aerial Transport Committee does anything to justify its existence, one cannot expect orders to flow in as they are flowing at present. Output will have to be reduced to a fraction of its size to-day. A firm which is entirely self-contained will find much of its huge workshops standing idle—at any rate, for several years after the war.

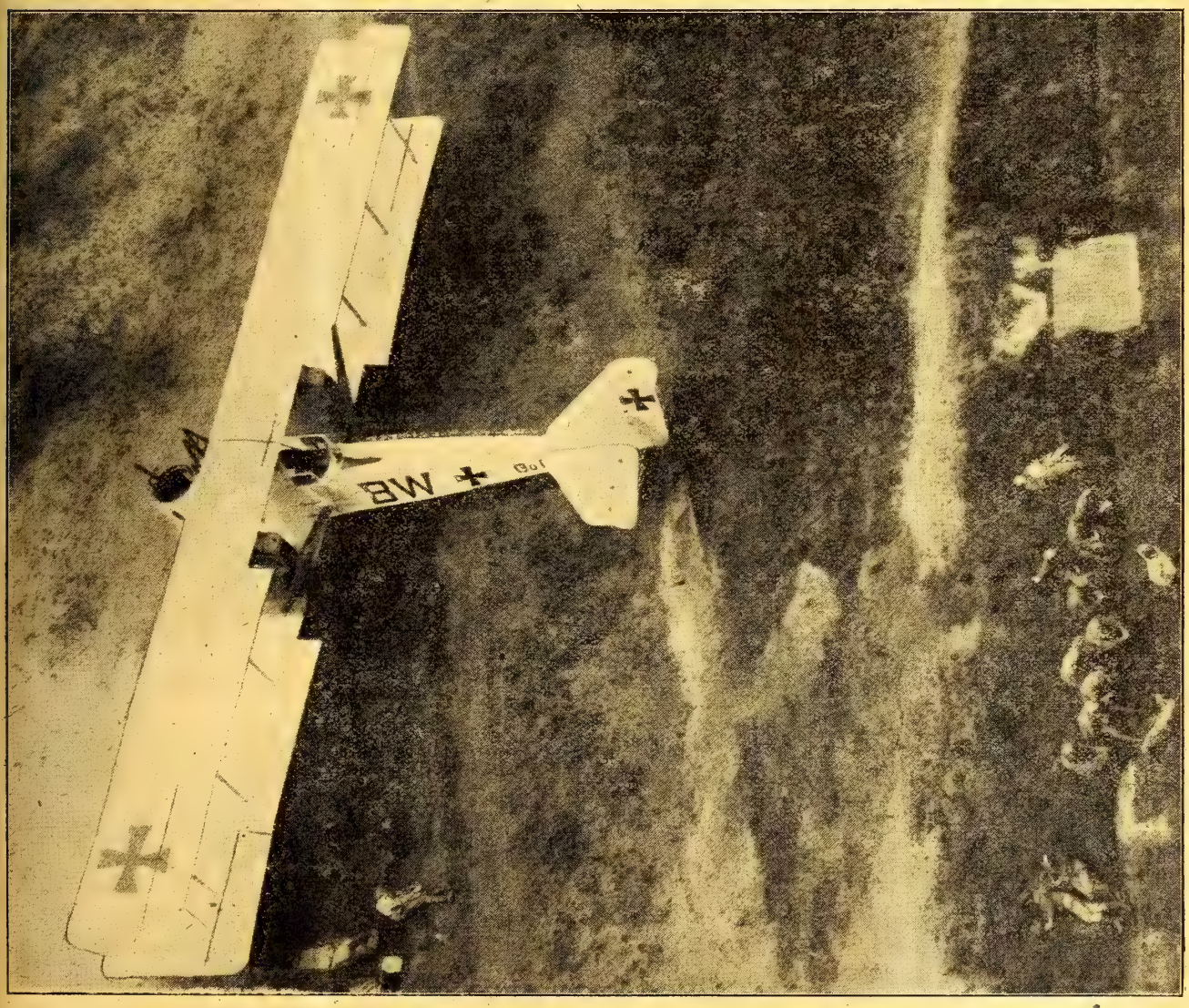
On the other hand, a firm which relies largely on sub-contractors will find itself in a far better position. All the little sub-contractors will want to get back to their original trades, making bits of motor-cars, or tin cans, or lavatory fittings, or what not. The result will be that the direct contractor's works, which have to-day become merely an assembling shop for parts from sub-contractors, will again become a manufacturing shop, and will probably find enough business to keep it quite comfortably busy during normal working hours. And it will probably show quite respectable profits.

The over-developed factory, however, will have to find fresh business of some sort, and may possibly have to side-track itself onto a different trade altogether, and so will not be in a position to handle its share of the aeroplane trade when the boom in civilian flying comes along after the slump which is almost certain to follow the present war-boom. Apropos which change-over of occupations, here is an illustrative story which still seems to be new to many people.

A Ford Story.

Two wicked munition-profiteers were discussing how best to invest their ill-gotten gains so as to get as much as possible out of them after the war. "Well!" said one, "I'm laying down my plant to turn out steel shrapnel-helmets by the million."

"Man! You're mad!" said the other. "The war can't possibly last more than another three or four years,



A GOTHA FROM ABOVE.—The attendant crew may be seen resting from their labours. The two projections, one on each side of the after cockpit, are not arm-rests, but appear to be guard-rails to prevent the after gunner from obtruding his gun or person into the orbit of the air-screws.

or five at most. And as soon as peace breaks out no one will want tin hats."

"Ah, that's just where you're wrong!" replied the first. "It's only after the war that we shall find the real market for steel helmets. Everybody will want 'em then."

"How on earth d'you make that out?" asked the second.

"Why," replied the first, "haven't you heard that Henry Ford is laying down a plant to turn out a thousand aeroplanes a day?"

Of course, everybody cannot be expected to have such phenomenal foresight as all that, so a judicious system of sub-contracting may save many a big aircraft firm from financial disaster after the war, because its post-war output will not then be overburdened by enormous dead charges for unusable workshops and machinery. Under the sub-contract system the overhead charges are split up among all the sub-contractors, and will fall away as the sub-contractors each return to their original occupation.

(To be continued.)

German Preparations for the Coming Air Struggle.

Reuter's correspondent with the French Army wrote on October 17th as follows:—

The vital importance of the question of air supremacy for the Allied nations could not be more effectively illustrated than by the following facts which have recently come to the knowledge of the French General Staff.

The Germans are well aware that some time next year the new American air squadrons will come into action on the Western Front, and they are already straining every nerve in order to be able to meet the Allied air offensive next spring.

MATERIEL.

The number of German battleplanes is to be doubled during the coming winter, and the aeroplanes and motor-building factories throughout Germany are enlarging their plant and obtaining reinforcements of labour to enable them to cope with the sudden influx of orders.

Switzerland is being laid under contribution. Two hundred and fifty Argus motors have been ordered from a firm in the Zurich district.

The Fokker firm, which is building fighting biplanes in great numbers, as well as a triplane remarkable for its speed and climbing powers, has taken over the great Berzina piano factories in Schwerin. [Presumably the triplane mentioned last week.—Ed.]

For bombing formations heavy three-seater machines are being built which can carry between seventeen and eighteen hundred pounds weight of bombs. They have Mercédès 260 horse-power motors, and when loaded can climb 12,000 feet in 35 minutes. [Gothas, A.E.G.'s, Rumplers, and Freidrishshafen products.—Ed.]

In every type of flying machine the Germans are feverishly producing new models for long-distance scouting expeditions. The 1917 Rumpler, with 260 horse-power Mercédès motor, is said to be the best machine.

They are also building a machine, made entirely of metal, to operate in conjunction with infantry on the battlefield. It has no great speed, and is a notably slow climber, and does not seem to be able to rise much above 10,000 feet. [The progeny of the famous "copper-belly" of the Ypres Salient early in 1915.—Ed.]

The enemy is also using a new six-cylinder Maybach motor, developing 240 horse-power, which is lighter than the ordinary Mercédès, and gives greater speed in climbing.

A big German bombing machine which lately landed in Holland was fitted with an electrical installation, driven by motor, for the purpose of warming the aviator. [This system of electric heating is an American device which was fully described in this paper nearly three years ago, and was introduced to the R.N.A.S. and turned down early in 1915.—Ed.]

During the six months from February to August twenty-nine important industrial establishments were added to the number of factories making aeroplanes or their accessories in Germany.

PERSONNEL.

Simultaneously with this great increase in the output of machines, the Germans are looking everywhere for recruits for the flying service. Applications for transfer to the air service are now received from both infantry and engineers, instead of being restricted to cavalry, as was the case not long ago. [So that is why the German pilots have been so much better than was expected during the last year! It bears out this paper's statement, of long before the war, that the horseman makes the best aviator. Also, it seems that Germany has been depleting her cavalry. It seems then that German pilots are not likely to improve in future.—Ed.]

Applications are now dealt with in a month instead of two months, and there is no doubt that, in the course of the present year, the personnel of the German air service has been largely reinforced. Volunteers are wanted chiefly for the fighting planes, because it is chiefly among the fighting squadrons engaged on the battlefields that casualties occur, but a large number of officers are being trained as observers for observation planes. [Also more fighting will be required in a mainly defensive war.—Ed.]

It is interesting to note that while the enemy is making all these efforts in order to be able at least to hold his own in the air next spring, German commanders are being recommended to use their aviators and machines, for the moment, as economically as possible. An order signed by General von Ludendorff, dated June, which has fallen into our hands, says that the Allies are employing their aeroplanes economically with a view to the great battles of the future.

"We should be wrong (it adds) to overwork and wear out our air formations, which are inferior in numbers, by sending them out several times every day. Consequently, the infantry and artillery must be told that it is impossible to prevent the enemy's planes from flying over our lines, and they must not get nervous when they see them overhead. Aviators are to be used sparingly in calm times in order that Germany may have as many of them as possible for great emergencies."—[All of which is very encouraging from our point of view.—Ed.]

ON THE AIR MINISTRY.

It was officially announced by Mr. Bonar Law in the House of Commons on Tuesday of last week—just too late for the fact to be noted in this paper—that the Government has decided to create an Air Ministry, with the usual accessories. There has been a consistent public demand for an Air Ministry, and now the public is to have what it demands.

There are many, among whom I confess to being one, who cannot comprehend the necessity in time of war for an Air Ministry any more than for an Artillery Ministry, or a Horse Ministry, so far as purely military needs are concerned. In time of peace an Air Ministry may be necessary in order to regulate aerial traffic, just as in more enlightened countries than this there is a Minister of Ways and Communications, or a Minister of Railways, or a Minister of Posts and Telegraphs, but that is another matter.

However, if there is to be an Air Minister, we must all accept the fact and support him, whoever he may be, with the utmost sincerity, as a matter of loyalty to King and Country.

The Air Minister will have no light task, for he will have to reconcile the conflicting demands of Navy, Army, and Air Service for men and material, and he will have to compete with the First Lord of the Admiralty and with the Secretary of State for War in the Cabinet for Governmental recognition of the importance of air operations as compared with operations on sea and land. His work will be of the most harassing nature, and it behoves all who have the welfare of aeronautics at heart to help him to the best of their ability, rather than to hinder him with criticisms or questions, until at least he has had a fair chance of settling down to work and getting his forces under proper control.

As to who the new Minister is to be, no announcement has yet been made, though naturally various

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names have been mentioned as possibilities, or certainties, for the office. Judging from the "Morning Post" of October 20th, the most likely person to be appointed is Mr. Winston Churchill. The "Post" is generally well informed as to what is going on behind the scenes, and the virulence of its attack on Mr. Churchill seems to indicate that the proprietor of the paper regards his appointment as imminent. With the exception of the aforesaid proprietor, and Charles, Lord Beresford, and their immediate following, the rest of the country would doubtless, and certainly the great majority of the Flying Services would, welcome Mr. Churchill as the first Air Minister.

Certainly none has a better right to the job, for Mr. Churchill is the only personage of Cabinet rank who has taken an active interest in aeronautical affairs. He created the Royal Naval Air Service, and left it as a going and growing concern when he retired from the Admiralty. Its subsequent vicissitudes were none of his making. He is himself a capable pilot, and is in close touch with active-service aviators. Moreover and especially he is an ardent believer in Air Power.

His work at the Ministry of Munitions during his few months of Office has been of high value to the Nation, but as Air Minister his quick grasp of situations and ideas, his intense energy, and his earnest patriotism would be of still greater value. In the chiefs of departments at the present Air Board he would find men as keen and as energetic as himself, and, though energetic minds sometimes come into conflict as to methods, there would be great hopes of the earnestness of all concerned succeeding in avoiding friction and working together for the common good in the event of Mr. Churchill being appointed.

In the ordinary course of events, Lord Cowdray, the President of the Air Board, should be the first Air Minister, but it will be remembered that he was on the point of retiring, owing to ill-health, some time ago, and it is said that he only consents to hold office until the new Air Minister is announced. If, however, owing to political friction, no politician is appointed, and if Lord Cowdray consented to remain as Air Minister, such a decision would meet with very general approval, for as chief of the Air Board he has won the personal respect and regard of all who have come in contact with him.

It has also been suggested that Sir William Weir should be appointed Air Minister if Mr. Churchill cannot have the Ministry of Munitions and if Lord Cowdray prefers not to carry on with increased power under the bigger scheme. Undoubtedly Sir William Weir would be an excellent Air Minister. His energy is astonishing. His keenness as a producer is unsurpassed. He is trusted commercially and liked personally by everyone in the Aircraft Industry who has come into contact with him. As an engineer and organiser he has experience and achievement to his credit. Undoubtedly he would make as great a success of the job as anyone could do.

Yet one cannot help thinking that in gaining an excellent Air Minister we should lose a super-excellent Controller of Aeronautical Supplies. Someone would have to take over the work which he has been doing so ably for the past six months, and, though the newcomer would step into a ready-made system of high quality, he would have to begin to learn all the things which Sir William Weir has learned since he took office, and would have to get hold of the ends of all the strings which Sir William has collected and come to know by heart in this period. If Sir William Weir does become Air Minister, all will wish him well, but they will wish equally sincerely that he may find as good a man as himself to carry on his present work.

Naturally General Smuts, as Mr. Lloyd George's right hand, has been mentioned as a likely candidate, and many a worse appointment might be made. General Smuts has had a distinguished political career, as well as variegated experience as a fighting man, so doubtless he would be more than a match for political opponents. One fancies, however, that he is more likely to take over a post concerned more directly with the warlike operations of the Air Ministry than that of political chief.

The name of Major Baird, at present Parliamentary spokesman for the Air Board, has also been mentioned as a possible Air Minister. If one were discussing possibilities, one might also include Mr. H. G. Wells, Mr. F. W. Lanchester, and the successful candidate for East Islington—whoever he may be by the time these notes appear in print—but space is lacking for the discussion of possibilities. Suffice it that whoever may be appointed will have the good wishes and loyal support of all concerned with Service flying.—C. G. G.

A GERMAN VIEW.

Professor Wegner, in an article in the "Cologne Gazette," describing the recent battles on the Western Front, says of the R.F.C. :—

Of aviators also the English had prepared masses in excess of everything known before. This development was sudden, and it took some time before we had caught up with the numerical superiority. The enemy aviators tried to advance in swarms over our lines, but the perfect bravery of our men was able to force them back, and in the main to keep them behind their own lines.

In these days the Englishman directed infantry attacks on a small scale against particular strong concrete defences in our lines which were known to him, his fear being that, when the main attack took place, these concrete defences might, as on former occasions, be centres of a dangerous resistance.

PRESENTATION AEROPLANES.

A contribution of £1,000 towards the cost of the purchase of an aeroplane has been presented to the Government by the Oba of Benin, on behalf of the Native Administration of Benin in the Southern Provinces of Nigeria.

A Reuter message from Simla on Oct. 20th states that the Jam Sahib of Jamnagar has generously offered the Government a lakh of rupees (£6,666) to purchase aeroplanes for use on any front. The offer has been gratefully accepted.

ITALY AND THE U.S.A.

On September 13th Captain Resnati, who is at present demonstrating a Caproni triplane at Norfolk, Va., remained in the air for six hours with ten passengers—a world's record. During this time he flew all over the Virginia peninsula, out to the Virginia capes, and far into the country.

On September 24th Captain Resnati carried twenty-four passengers for a distance of 50 miles near Norfolk, Va.

AN AIRMAN'S OUTINGS.

Under the title of "An Airman's Outings," an officer of the Royal Flying Corps, who has adopted as *nom-de-plume* the order "Contact," has written something of his experiences abroad.

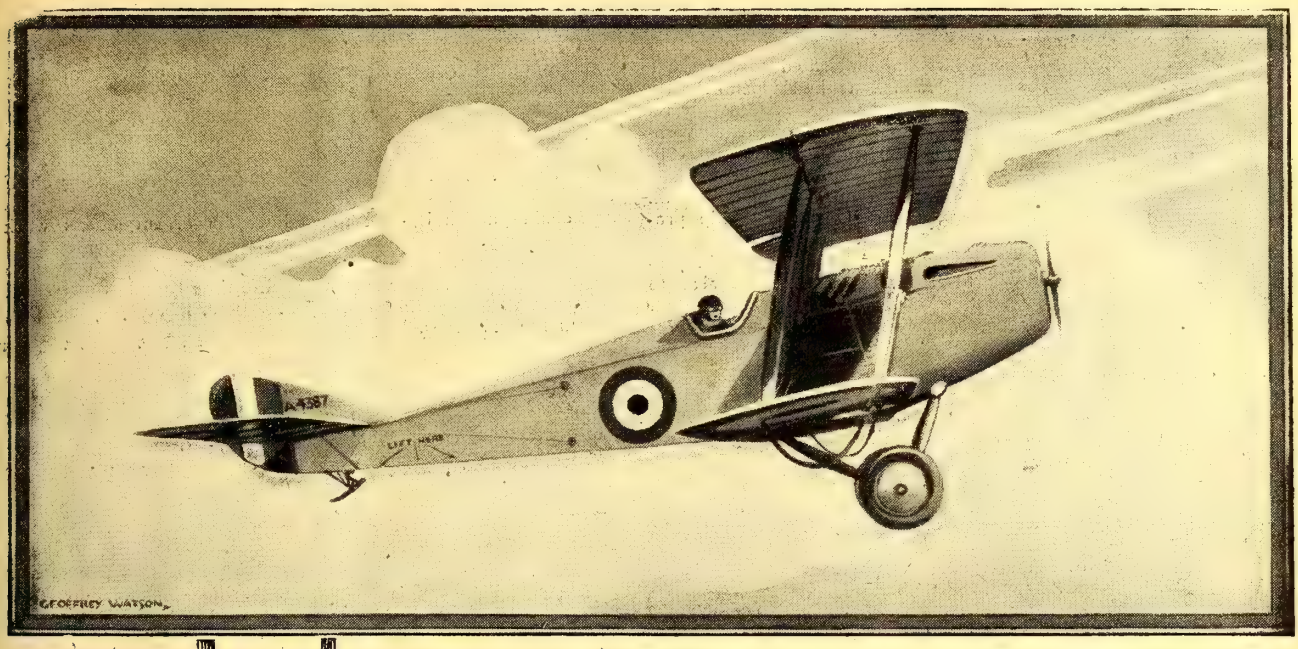
The book has a brief but pithy and thoughtful preface by Maj.-General W. S. Brancker, who points out that the stories told therein are part of the annals of a squadron which for a time held a record in the heaviness of its losses. He concludes with the sentence, "War has been the making of aviation. Let us hope that aviation will be the destruction of war." A curious and yet a fine sentiment from a soldier of proved gallantry.

The author tells his story in plain, matter-of-fact language, with absolutely no pretence at what is usually called style, and with Spartan brutality which would ill become anyone who had not faced death many times himself.

The dedication is characteristic of the whole book. Who, but a soldier, would dare to dedicate his work to "The Fallen of Umpty Squadron, R.F.C."?

The subject-matter, viewed as ante-room talk, is full of interest; as literature it is at times regrettably but truthfully slangy, but as a record of active service flying by one who really knows what it is, the book is extraordinarily fine stuff.

[Wm. Blackwood and Sons, 324 pp., price 5s. net, or post free from the Wm. Dawson Publishing Co., Ltd., Rolls House, Breams Buildings, E.C.4, 5s. 6d.]







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KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

On the Press, Politicians, and the Zeppelin Raid.

Never in a long and contemptuous career as a newspaper reader have I come across as much pure unadulterated tosh on one subject in a few days as has been published on the Zeppelin raid of Friday last. Considered purely as a sporting attempt to rehabilitate the big airship in the esteem of the German Government and people, the raid was rather a good effort. But considered as a raid it was very much a wash-out.

It was up to the airship people to prove that they can do all that aeroplanes can do and more, if the German airship programme is not to be curtailed in order to increase the aeroplane programme. In this they failed badly, and merely proved precisely the limits of airships. If an airship keeps so low as to be within sight of the ground it is at the mercy of searchlights, guns, and aeroplanes. If it goes so high as to be difficult for its enemies to find, it loses itself.

Judging by published evidence it appears that one airship kept low, for it was heard crossing Holland. It thus remained in the comparatively still air near the ground and sea, and was able to make headway towards its home, presumably in Northern Germany as the Belgian and West German airship sheds are now in the danger zone. The others apparently went up high to be out of danger, and so found the prevailing air-current which blows at night even when the cooling of the earth and the air near it has produced a calm.

During the day the wind was blowing from the North of West. As Lord Montagu pointed out in his lecture some months ago, as one reaches higher altitudes one finds the air-currents stronger and always taking a clock-wise twist, so that at the extreme height reached by the airships the wind was probably blowing from the North. Plugging steadily on a compass-course for Northern Germany, the ships were blown South as fast as they went East, and consequently when they came down at dawn to discover their whereabouts in Germany, they found themselves far towards the South of France. By that time several of them had exhausted their petrol, so they had to land or be carried into the Mediterranean. The lucky ones managed to scrape into Germany somehow. And that is about all there is to it.

Press Comments.

The "Times" starts its leading article by saying "Zeppelins have once more bombed England, but France has routed them," and says later "The public, therefore, ask why Zeppelins can be destroyed in France and not in England," and "we should welcome some further assurance of the present ability of our own air organisation to emulate the example of our Allies." The reply to the doubt implied by the "Times" is the very simple one that our gallant French friends were operating in daylight, that we were not, and that, despite this, two airships, out of three attacked, eluded them and escaped. If one had some further assurance of the present ability of the organisation of the "Times" to run a newspaper as well as "our own air organisation" is run, one would feel very much better satisfied about fitness of that journal to discuss aeronautical affairs. For all the credit given to the French Service d'Aviation it appears as if the other Zeppelins landed in France more through an act of God than of their enemies, excepting the one which shot down in flames near Lunéville. Which is no discredit to the Service d'Aviation, who probably never saw most of the airships at all till they had been landed and burnt by their crews.

The "Daily Mail," as one might expect, is still further wide of the mark. It says "the collapse of our arrangements on Friday night must be admitted. Lord French has a serious failure to explain." "We know from long experience that our airmen could not have been given a fair chance, or they would have accounted for some of the Zeppelins." "This much is certain—that an air raid is an operation for an air-staff to meet, and we shall never have a real air-staff until we have an independent Air Service." To all of which one might equally well say that we shall never have a real newspaper-staff till we have an independent newspaper free from political interests.

Whence does the "Mail" think this wonderful air-staff-to-be is coming, except from the existing Flying Services. It is difficult to see where the Imperial Air Service, or the promised Air Ministry is to find a better "air staff" than that which is running Service aeronautics to-day, unless it distributes commissions among the angels, and appoints St. Michael Director-General.

It certainly will not find better people inside the Flying Services, and only a born fool would imagine that better are to be found outside those Services. To say that Lord French has a serious failure to explain is about as reasonable as to say that Sir Douglas Haig has a serious failure to explain because the recent pushes in Flanders have not captured the whole of the Passchendaele Ridge, and have not captured Staden and Roulers

Presumably, it has never occurred to the "airmanship expert" of the "Mail" that three or four bombs sprinkled blindly over London may be preferable to the descent of a whole load of bombs, plus some two hundred yards of burning Zeppelins, plus some hundreds of gallons of blazing petrol in a crowded area. Nor, perhaps, has the said "expert" discovered that only the Germans, with their nerves on the jump, let loose a whole artillery barrage because a small patrol has been spotted crawling towards the German trenches, and so disclose their artillery positions to our aviators. So far from our arrangements collapsing on Friday night, the probability is, if one only knew the whole story, and could publish it, that never have our arrangements worked more sweetly. Evidently, the "Mail" has a serious failure to explain in the way in which its editorial authorities have dealt with the Friday night raid. It is quite time that Lord Northcliffe came back to England and rapped some of his employees smartly across the knuckles.

Even the "Daily Express," which has of late been doing valuable work by consistently advocating raids on Germany, and has thus helped to swamp the Bishops and other "conscientious objectors" who are afraid of hurting German munition-makers, ran a bit off the rails, and asked: "What is the matter with the Air Command"? It also talked of "marauders . . . absolutely unmolested by the British Air Command," said that "The French Air Command was on the alert, and the achievement was magnificent," and wound up with "The remark of a naturally irritated and harassed Air official that it has nothing to do with the public will not do. It has everything to do with the public."

One quite agrees that it has everything to do with the public. And the thing that has most to do with the public is that we should not disclose for the benefit of the enemy, nor even indicate ever so slightly, what precisely were the tactics pursued on Friday night, and what was the larger strategic scheme behind them.

As to the rest of the Press, the columns of tosh turned out, from the descriptions of wholly impossible "aerial torpedoes" to the stories of frozen petrol, and ice-embedded German corpses falling from wrecked Zeppelins in France, would be exquisitely funny if one did not realise that the majority of people believe what they see in print. The old adage, "Believe half of what you see, and nothing that you hear," applies admirably to the British public as concerns its relations with aerial matters in general, home defence in particular, and the daily papers pre-eminently. Certainly, in its own interests the lay Press would be well advised not to go off at half-cock on the subject of matters about which it knows nothing at all.

In Parliament.

On the evening of Oct. 23rd, the House of Commons let itself loose on the subject, with about as much "savvy" as the Press. Sir George Cave, the Home Secretary, who is one of the few politicians for whom one can feel any respect, explained that five Zepppelins reached the neighbourhood of London, and that only one crossed over any part of London—which ought to have explained the situation clearly enough to anyone with common sense. Mr. Macpherson (Under Secretary for War), another trustworthy official, told the House that our aeroplanes were up throughout the raid. Mr. Billing, as ever a humorist, asked whether the Government would give special instructions for the safe custody of ballot-boxes.

These official replies, however, did not prevent Sir F. Lowe, who comes from Birmingham, from moving the adjournment of the House, and finding the necessary forty members to support him. Though such forty have not been found to support a similar motion on much more important matters, they cropped up quickly enough on what they were pleased to consider "the inadequate defence" against this air raid. Sir F. Lowe expressed his surprise that there was "no firing of anti-aircraft guns, nor any attempt to disturb the assailants in their diabolical proceedings," and more to the same effect. Mr. Joynson-Hicks remarked sensibly that the real defence was an attack on Germany, and asked for more information.

Mr. Dillon, of Mayo ("God help us" is every Mayo man's motto), speaking on behalf of all Londoners, said that "on no previous occasion was the defence so helpless as it was on Friday night," and that he was "an absolute sceptic as to the impossibility of stopping these attacks." Perhaps, as Mr. Dillon has such beliefs, he will evolve a scheme for stopping Sinn Feiners.

Mr. Austin Chamberlain, another Birmingham man, preached the usual official platitudes about the admirable attitude of the people of London. Admiral Sir Hedworth Meux, with all the cock-sureness of the Naval officer discussing somebody else's job, said that "the sooner the barrage was done away with the better," and did not believe there was a military man who believed in it. Mr. Bonar Law, displaying his customary mental attitude of the retail ironmonger, made great play with the fact that "only last month we dropped behind the German lines no less than 8,000 bombs," an argument quite worthy of a mind which would rather deal in tin-tacks than in ferro-concrete barrages. One almost regrets to find him agreeing that raids





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on German towns are a real defence. It shakes one's faith in the efficacy of such raids.

Plain Common Sense.

However, as a leading politician on the Government side he was evidently primed with really reliable information, for he pointed out that when once a Zeppelin has gone to 17,000 feet or more she cannot reach that height again, so that when these ships reached France they were lower down than when in this country and were quite easy to find in daylight, though one was over Lyons in the dark for a long time and was not found. Also he pointed out that there is no sense in firing guns just because Zeppelins have crossed the coast, or turning on searchlights when it is found that they cannot get through a ground mist to the height at which the Zeppelins were flying. He added "What my hon. friends want is that they should put all the searchlights on in order to let the commanders of the Zeppelins know exactly where London is, and enable them to drop bombs on London."

So much is plain common sense, and whoever supplied Mr. Law with the information is to be congratulated on so clear a statement of fact. I wonder whether any official person will have the sense to issue these explanations to the Press as regular communiqués, to convince the mob that the defences are being properly handled.

On the whole the defences seem to have been handled most skilfully, and with evident regard to a proper scheme of anti-aircraft warfare. A new branch of the great science of war is being developed, and we are evidently doing well at it.

My only personal contribution to this discussion is the suggestion that we should renew our investigations into the possibilities of all-night patrol aeroplanes, of an improved "Night-Hawk" type—a type which cannot be discussed in print.

C. G. G.

THE ODYSSEY OF THE ZEPPELINS.

A Reuter telegram, dated Paris, October 21st, says:—It is now clear that the 11 Zeppelins which flew over French territory had come from England. It appears that the expedition against England was impeded from the beginning by a fog which covered the greater part of English territory. They lost their way completely, wandering aimlessly over England during the night, and their retreat was transformed into a disaster by the energy of the French defence forces, both aerial and anti-aircraft.

Three of them apparently escaped, but at dawn there were still eight Zeppelins on French territory. Of these, three, which kept company, attempted to cross the French lines between Lunéville and Baccarat. One of them was brought down in the environs of St. Clément by section 174 of the anti-aircraft defences. The two other airships escaped, but were attacked by four pilots belonging to Squadrons 77, 91, and 89, who caught and attacked one of them at a height of over 16,000 ft. Their ammunition giving out, the pilots were compelled to abandon the fight, but though lost in a fog they made a safe landing.

The five other Zeppelins remaining over French soil, attacked or worried by aeroplanes, were brought down or so disabled that they were compelled to land. L49 landed at 10 o'clock at Bourbonne-les-Bains, and was captured intact by French pilots. Her crew were made prisoners. L50 fell at Dammartin, near Montigny-le-Roi, at 11 o'clock in the morning. One of her gondolas caught in a tree whence it was torn off and fell. Two officers and 14 men of the crew had already reached the ground, and the Zeppelin thus lightened rose to a great height carrying with it four of the crew. She was, however, completely disabled.

Two other airships were sighted in the south of France. The first landed at Laragne, and the other was seen at four in the afternoon by the aviation centre of Fréjus, near Toulon. A fighting squadron at once rose from Fréjus in pursuit, but lost sight of the airship about five o'clock in the afternoon. She was then drifting towards the open sea travelling in a vertical position. If this, as is probable, is not the Zeppelin of Montigny-le-Roi, whose envelope and remaining crew have not been found, then the Germans yesterday lost five Zeppelins.

A Reuter telegram from Grenoble, dated Oct. 21st, says:—"Zeppelin L45, which came down on Saturday in the Mison district, measures over 656 ft. in length, and has three motors. The crew consisted of two officers and 15 men of the German Navy. When it alighted the crew made haste to set fire to the envelope with special pistols loaded with incendiary bullets, and then gave themselves up as prisoners. The height-measuring instrument which was found among the burning débris shows that the airship had risen up to a height of over 20,000 ft.

A telegram, dated Paris, Oct. 22nd, says:—The questions put to the crews of Zeppelins L49 and L50, who were taken prisoners, have thrown fresh light on the German raid.

The enemy, it appears, carried out their latest expedition with a fleet of 13 naval Zeppelins. The airships left separately on the evening of Oct. 19th, and, no doubt, from three different bases, as usual. The night was pitch black when they set out; they never go out in moonlight. The raid was expected to last from 20 to 26 hours. The Zeppelins made for the English coast, which they recognised by the lights. They were much worried by the British anti-aircraft fire, and especially by the many searchlights. Then it was that they dropped nearly all their bombs.

The fleet was flying at a height of over 16,000 ft., when it was suddenly struck by a strong north-east wind. The Zeppelins tried to get back to their bases, but the contrary wind made progress slow. At dawn the L49 thought she was near Holland or Westphalia. She came down fairly low, and the crew waved white flags. It was only between 8 and 9 o'clock that the commander realised that they were in France. Moreover, just at that moment the L49 was sighted by several French aeroplanes, which speedily forced her to land.

Soon after the L50 passed over the L49, which was then surrounded by French aeroplanes. The L50 manœuvred to try to land in a neighbouring wood in order to let the crew escape in the best possible conditions, but one of her gondolas got caught, and some of the men in it landed by parachute.—[Parachuting out of a tree must be a good game.—Ed.]—The gondola was then destroyed by incendiary pistol bullets.

The officers adopted a very arrogant tone, and demanded special rooms and special treatment at the hotel. They were greatly surprised when they were treated as prisoners.

It should be noted that the prisoners' statements show that the raid was carried out by 13 Zeppelins, but two of these must have returned directly to their base, as only 11 Zeppelins flew over French territory.

The two airships L49 and L50 belong to the class of super-Zeppelins. They measure 196 metres (650 feet) in length, and their cubic capacity is 55,000 cubic metres (nearly 2,000,000 cubic feet).

The crew belong to the Navy, the majority of them being warrant officers who have followed special instructional courses. They were warmly clad in leather garments with fur underneath.

THE R.N.A.S. COMFORTS FUND.

The recent appeals for contributions in aid of the R.N.A.S. Comforts Fund have brought to hand some very useful contributions, and it is sincerely to be hoped that others will feel encouraged thereby to contribute further to the good work.

Since the inauguration of the Fund in 1914 the personnel of the R.N.A.S. has expanded many times over, and therefore an increasing amount of money will be required if each man now in the Naval Air Service is to receive gifts of clothing and other comforts on as liberal a scale as hitherto.

Gifts of warm woollen clothing in blue and khaki are also solicited, and those who are only able to contribute a small amount in money will make their contributions go considerably further if they undertake the making of garments themselves, and so save the cost of manufacture. Contributions, both in cash and kind, should be sent to Mrs. Henry Balfour, Langley Lodge, Headington, Oxford. The following contributions and other receipts are announced, which brings the grand total to £5,109 9s. 7d.:—

Brought forward, February, 1917, 4,855 10s. 11d.. Mr. F. E. Rosher, per sale of "In the R.N.A.S.," £25; Messrs. Child and Co., per Mr. Fane, £21; Lady Samuel £10 10s.; Mrs. Sueter, £10; Sqdn. Comdr. Oliver (proceeds of concert), £8; Admiral and Mrs. Mark Kerr, £5 10s.; Mr. W. H. Kendal, £5 5s.; Mrs. Dobell, £5; S. Samuel, Esq., M.P., £5; General Sir C. Mansfield Clarke, £5; Mrs. Edmonds, £5; Duke and Duchess of Sutherland, £3 3s.; Matron and Domestic Staff of the Royal Infirmary, Bradford, £2; Lady Walker, £2; Mrs. W. Levy, £2; Capt. and Mrs. McLaughlin, £2; Admiral Sir Edmund Freemantle, £1 1s.; Col. Sir Mathew Nathan, R.E., £1 1s.; the Hon. Lady Barker, £1; refunded by Mrs. Mackworth, £125 12s. 1d.; refunded per Messrs. Wyatt, £7 10s.; refunded petty cash, £1 6s. 7d.; total, £5,109 9s. 7d.

The following must be added. Mrs. Holt Thomas, £50; Mrs. Balfour (collected), £15 3s. 6d.; Mrs. Ruck Keene, £3; Mrs. Mocatta, £2 2s.; Mrs. Saunders, £1; Lady Flower, 10s.: Total, £71 15s. 6d.

A RAID SHELTER CORPS.

A large and representative meeting was held on Oct. 17th at the Jewish Board of Guardians, Middlesex Street, when it was resolved to form an Air Raid Shelter Corps, having for its object the provision of a body of volunteers who would endeavour to restore confidence during air raids by giving every possible assistance to women, children and the infirm.

Mr. Albert I. Belisha, who presided, said they had met to devise some means of assisting those who had little chance of protecting themselves during air raids. Though they had assembled at the Jewish Board of Guardians, he desired it to be clearly understood that they had not met in any sectarian spirit, but purely as Englishmen, with the view of restoring confidence and to be generally helpful by persuasion and good example. He was able to inform them that Major Lionel de Rothschild had expressed himself in warm sympathy with the movement, and he was grateful to Mr. Vincent Pitman for having inaugurated it.

[Excellent scheme! And the beauty of the idea is that the work of the corps will be done under cover. It should have no difficulty in recruiting.—Ed.]



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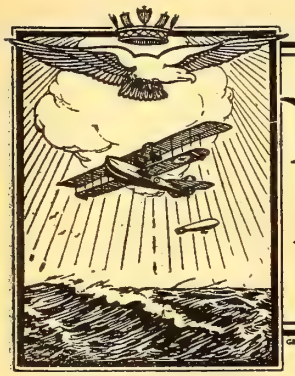
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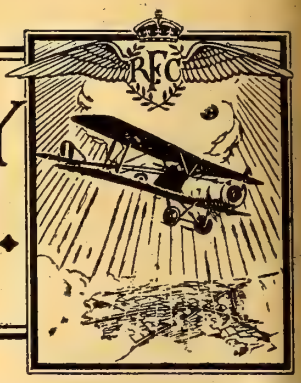
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NAVAL and MILITARY AERONAUTICS



FROM THE "LONDON GAZETTE."

Admiralty, Sept. 26th.

R.N.A.S.—Prob. Sqdn. Comdr. to be Sqdn. Comdr. :—A. L. Berry, Sept. 21st.

Temp. Proby. Flt. Lt. to be temp. Flt. Lt. :—G. D. Nelson, Sept. 21st.

Flt. Sub-Lts. to be Flt. Lts. :—H. Gartside-Tippinge, E. L. D. Bartley, Sept. 15th.

War Office, Oct. 16th.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing.—Staff Officer, R.F.C., 1st Cl.—Graded as an A.A.G.—Capt. C. Fraser, N. Staff. R., from a Staff Officer, R.F.C., 2nd Cl. (graded as a Brig.-Maj.), and to be temp. Lt.-Col. while so empld., vice Maj. (temp. Lt.-Col.) P. R. C. Groves, Shrops. L.I., Sept. 15th.

Staff Officer, R.F.C., 2nd Cl.—Graded as a Brig.-Maj.—Capt. G. C. Anne, York. L.I., T.F., from a Staff Offir., R.F.C., 3rd Cl. (graded as a Staff Capt.), viec Capt. (temp. Lt.-Col.) C. Fraser, N. Staff. R., Sept. 15th.

Wing Comdr.—Maj. (temp. Lt.-Col.) P. R. C. Groves, D.S.O., Shrops. L.I., from a Staff Offr., R.F.C., 1st Cl. (graded as an A.A.G.), and to retain his temp. rank whilst so empld. Capt. (temp. Maj.) A. C. Boddam-Whetham, Arg. and Suth'd Highrs., Spec. Res., from a Sqdn. Comdr., and to be temp. Lt.-Col. whilst so empld. Sept. 15th.

Flt. Comdr.—From Flying Officers, and to be temp. Capts. whilst so empld. :—Lt. T. V. Hunter, Rif. Brig., Sept. 30th. Temp. Lt. G. A. Hyde, M.C., Gen. List, Oct. 3rd.

Equipment Officers, 1st Cl. :—Capt. A. L. Gregory, M.C., Dorset R., Spec. Res., from the 2nd Cl. Sec. Lts. (temp. Lts.), Spec. Res., from the 2nd Cl., and to be temp. Capts. whilst so empld. :—R. T. Vernon, W. W. Hall, E. F. B. Curtis, Oct. 1st.

2nd Cl., from the 3rd Cl.—Lt. G. L. Godden, Spec. Res., Sept. 1st. Lt. H. B. FitzHerbert, Spec. Res., and to be temp. Lts. whilst so empld. :—Temp. Sec. Lt. W. E. Phillips, Gen. List, Sec. Lt. E. A. Molyneux, Spec. Res. ; Sec. Lt. M. F. A. Faine, Spec. Res. ; temp. Sec. Lt. C. A. Stevenson, Gen. List ; temp. Sec. Lt. S. McLaughlin, Gen. List, Oct. 1st.

War Office, Oct. 17th.

REGULAR FORCES.—Staff.—The following temp. appts. are made at the War Office :—

3rd Grade.—Maj. F. G. Maughan, D.S.O., Durh. L.I., July 17th. Maj. R. H. Howell, Ind. Cav., from a Flt. Comdr., R.F.C., vice Capt. C. B. Krabbe, Yeo., T.F., Sept. 15th.

ESTABLISHMENTS.—R.F.C.—Mil. Wing.—Flt. Comdr.—Temp. Capt. G. E. F. Sutton, M.C., Can. Local Forces, from a Flying Officer, April 27th (substituted for the notification in the "Gazette" of Aug. 23rd.

Instr. in Gunnery.—Graded as an Equipment Offr., 1st Cl.—Lt. G. E. Smith, E. York. R., from Lt. (actg. Capt.), M.G.C., to relinquish his actg. rank, to be temp. Capt. whilst so empld., and to be secd., Sept. 25th.

Adjt.—Temp. Capt. T. G. Bowler, Dorset R., vice Capt. Le G. G. W. Horton, K.R. Rif. C., Oct. 1st.

Gen. List.—Serjt. A. J. Shaw, from R.F.C., to be temp. Sec. Lt., Sept. 22nd.

* * *

The King has been pleased to award the Military Medal to the following ladies for conspicuous gallantry displayed in the performance of their duties on the occasion of hostile air raids on casualty clearing stations in the field :—

Actg. Sister Ellen Byrne, Q.A.I.M.N.S. (R) ; Staff Nurse Elizabeth Jane Eckett, T.F. Nursing Service ; Sister Winnieford Muriel Hawkins, T.F. Nursing Service ; Sister Alicia Mary Kelly, Aust. Army Nursing Service ; Sister Rachel Pratt, Aust. A.M. Corps. ; Acting Sister Catherine Murray Roy, Q.A.I.M.N.S. ; Sister Minnie Wood, Q.A.I.M.N.S.

War Office, Oct. 18th.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing.—Flt. Comdrs.—From Flying Officers, and to be temp. Capts. whilst so empld. :—Temp. Sec. Lt. A. B. Cook, Gen. List, Oct. 2nd. Temp. Lt. W. A. L. Poundall, M.C., S. Lan. R., Oct. 4th. Temp. Sec. Lt. N. E. Barraclough, M.C., Gen. List, Oct. 5th.

Adjts.—Capt. R. C. Burton, Yeo., T.F., and to be secd., Aug. 7th. Capt. Sir W. P. C. Lethbridge, Bt., G. Gds., Sept. 14th.

Depôt Comdr.—Capt. (temp. Maj.) A. Vere Bettington, Spec. Res., from a Sqdn. Comdr., and to be temp. Lt.-Col. whilst so empld., Aug. 7th.

Special Appt.—(Graded as an Equipment Officer, 1st Cl.).—Capt. G. P. Burrell, M.C., Hamps. R., T.F., from an Equipment Officer, 3rd Cl., Sept. 22nd.

Equipment Officers, 2nd Cl.—From the 3rd Cl.—Temp. Sec. Lt. E. Drudge, Gen. List, and to be temp. Lt. whilst so empld., June 1st. Lt. F. W. H. Lerwill, Spec. Res., Sept. 29th. Sec. Lt. J. S. Reid, Spec. Res., and to be temp. Lt. whilst so empld., Oct. 1st.

Gen. List.—Qrmr.-Serjt. Archibald Charles Hill to be 2nd Lt.

Overseas Contingents.—Canada.—The following are secd. for duty with the War Office :—Temp. Capt. J. A. Revill is secd. for duty with the R.F.C., Sept. 6th.

* * *

His Majesty the King has been pleased to confer the following rewards for gallantry and distinguished service in the field. The acts of gallantry for which the decorations have been awarded will be announced in the "London Gazette" as early as practicable :—

Bar to the Military Cross.

Sec. Lt. Leonard Monteagle Barlow, M.C., R.F.A., Spec. Res., attd. R.F.C. (M.C. gazetted Aug. 25th, 1917).

Lt. (temp. Capt.) Clive Franklyn Collett, M.C., R.F.C., Spec. Res., and Gen. List (M.C. gazetted Sept. 26th, 1917).

Temp. Capt. Philip James Vaughan Lavarack, M.C., Gen. List and R.F.C. (M.C. gazetted May 25th, 1917).

Temp. Sec. Lt. (temp. Capt.) Edward Mannock, M.C., R.E. and R.F.C. (M.C. gazetted Sept. 17th, 1917).

Sec. Lt. (temp. Capt.) Donald Fasken Stevenson, Yeo. and R.F.C. (M.C. gazetted Sept. 17th, 1917).

The Military Cross.

Temp. Capt. Rupert Norman Gould Atkinson, Gen. List and R.F.C.

Sec. Lt. John Auguste Boret, R.W. Surr. R. and R.F.C.

Temp. Sec. Lt. Charles William Cudemoer, Gen. List and R.F.C.

Sec. Lt. (temp. Lt.) Julius Diamond, K.O.S.B., Spec. Res., and R.F.C.

Temp. Sec. Lt. Matthew Brown Frew, Gen. List and R.F.C.

Temp. Sec. Lt. Reginald Edgar Gilbert Fulljames, Gen. List and R.F.C.

Temp. Lt. Herbert Donald Harman, Gen. List and R.F.C.

Lt. Spencer Bertram Horn, D. Gds. and R.F.C.

Temp. Sec. Lt. Henry Albert Jones, attd. Wilts. R. and R.F.C.

Capt. Gerald Joseph Constable Maxwell, Yeo. and R.F.C.

Temp. Sec. Lt. Keith Knox Muspratt, Gen. List and R.F.C.

Sec. Lt. Alan Christopher Temple Perkins, R.G.A., Spec. Res., attd. R.F.C.

Temp. Sec. Lt. Walter Maurice Pierce, Gen. List and R.F.C.

Temp. Sec. Lt. (temp. Capt.) W. J. Tempest, D.S.O., Gen. List and R.F.C.

Sec. Lt. (temp. Lt.) F. W. H. Thomas, Yeo. and R.F.C.

Capt. C. T. Vachell, Mon. R. and R.F.C.

Sec. Lt. (temp. Lt.) L. Walmsley, E. York. R., Spec. Res., and R.F.C.

Temp. Lt. Oliver Byerley Walter Wills, R.F.C.

Sec. Lt. Frederick Woodcock, R.G.A., Spec. Res. and R.F.C.

* * *

The King has been pleased to award the Military Medal for bravery in the field to the following man :—

7443 1st Cl. Air Mech. F. A. Biscoe, R.F.C. (East Sheen).

47936 2nd Cl. Air Mech. W. Hewitt, R.F.C. (S. Gasforth).

50104 Sec. Cl. Air Mech. J. Thomas, R.F.C. (Pantyates).

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War Office, Oct. 19th

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing.—Staff Officer, R.F.C., 2nd Cl.—(Graded for purposes of pay as a G.S.O., 2nd Grade, at the War Office.)—Capt. R. B. Bourdillon, M.C., Spec .Res., from a Flt. Comdr., Sept. 21st.

Flt. Comdr.—Lt .(temp. Maj.) The Hon. O. M. Guest, Yeo., T.F., to revert from a Sqdn. Comdr., to relinquish his temp. rank, and to be temp. Capt. whilst so empld., Oct. 1st, seniority Nov. 21st, 1915.

Asst. Instr. in Gunnery.—(Graded as an Equipment Officer, 3rd Cl.)—Lt. T. N. Weguelin, Hamps. R., T.F., and to be secd., Oct. 5th, 1917.

Adjts.—Capt. S. M. Pearce, Leic. R., T.F., Sept. 17th. Capt. F. W. I. V. Fraser, M.C., Seaf. Highrs., Oct. 3rd.

Park Comdr.—Sec. Lt. (temp. Capt.) E. Bush, W. Rid. R., from an Equipment Officer, 1st Cl., and to be temp. Maj. whilst so empld., Aug. 22nd.

School of Instruction.—Schools of Mil. Aeronautics.—Asst. Instr.—(Graded as an Equipment Officer, 2nd Cl.)—Temp. Sec. Lt. M. A. Millar, Gen. List, from an Equipment Officer, 3rd Cl., and to be temp. Lt. whilst so empld., Sept. 12th.

Gen. List.—Temp. Lt. (temp. Maj.) G. R. Moser, Arg. and Suth'd Highrs., to be temp. Lt.-Col. whilst Comdt. (graded as a Depôt Comdr.) of a School of Aerial Gunnery, April 1st. Flt. Serjt. R. Scoon, from R.F.C., to be temp. Sec. Lt., Sept. 30th.

SUPPLEMENTARY TO REGULAR CORPS.—R.F.C.—Mil. Wing.—Lt. (temp. Capt.) A. M. Low relinquishes his commn. on appt. to R.N.V.R., Oct. 2nd.

War Office, Oct. 20th.

REGULAR FORCES—Staff.—The following temp. appts. are made at the War Office :—Dir.—Capt. (temp. Lt.-Col) F. C. Jenkins, R.F.C., Spec. Res., from an Asst. Dir. and to be temp. Brig.-Gen. while so empld., Aug. 31st.

Dep. Dir.—Capt. (temp. Lt.-Col.) C. H. Whittington, R.F.C., Spec. Res., from an Asst. Dir., and to be temp. Col. while so empld., Aug. 31st.

Asst. Dir.—Temp. Capt. R. H. Austin-Sparks, Gen List, from a Dep. Asst. Dir., and to be temp. Lt.-Col. whilst so empld., vice Capt. (temp. Brig.-Gen.) F. C. Jenkins, R.F.C., Spec. Res., Aug. 31st.

Dep. Asst. Dirs.—Temp. Lt. (temp. Capt.) R. W. Roylance, Gen. List, from a Staff Capt., and to retain his temp. rank whilst so empld.; temp. Capt. W. H. Ewen, Gen. List, from a Staff Capt., vice temp. Capt. (temp. Lt.-Col) R. H. Austin-Sparks, Gen. List; temp. Capt. K G. S. Hatfield, Gen. List, from a Dep. Asst. Dir. (graded as a Staff Capt), Aug. 31st.

ESTABLISHMENTS.—R.F.C.—Mil. Wing.—Flt. Cmdrs.—Lt. I. A. J. Duff, Dorset R., T.F., from a Flying Offr., and to be temp. Capt. whilst so empld., Sept. 12th. (Substituted for notification in "Gazette" of Sept. 20th.) From Flying Officers, and to be temp. Capts. whils tso empld. :—Sec. Lt. (temp. Lt.) M. Thomas, Welsh R., T.F., July 29th. Lt. G. E. W. Hitchcock, R.E., Spec. Res., and Sec. Lt. C. F. Davies, R. Highrs, T.F., Oct. 5th.

Gen. List.—Serjt. W. H. Goodbrand, from R.F.C., to be temp. Sec. Lt., Sept. 12th.

TERRITORIAL FORCE.—Glouc. R.—Capt. H. C. E Cherry is now secd. for duty with the R.F.C., July 27th.

War Office, Oct. 22nd.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing.—Special Appt.—(Graded as a Park Comdr.).—Temp. Lt. L. Legge, Gen. List, from a Special Appt. (graded as an Equipment Officer, 2nd Cl.), and to be temp. Maj. whilst so empld., Oct. 8th.

Gen. List.—Actg. Sjt.-Maj. S. T. Kemp to be Sec. Lt., Aug. 28th.

TERRITORIAL FORCE.—Royal Horse and Royal Field Artillery.—To be Lts., prec. June 1st, 1916 :—Sec. Lt. (temp. Capt., R.F.C.) F. N. D. Masters, sen. next below Lt. F. Ellerton, to retain temp. rank of Capt., R.F.C., and to remain secd.

* * *

The King has been pleased to award the Distinguished Conduct Medal to the following non-commissioned officers, and men. The acts of gallantry for which the decorations have been conferred will be published in the "London Gazette" next month if practicable :—

77690 1st Cl. Air Mech. A. W. Cant, R.F.C. (Uppingham).
4965 1st Cl. Air Mech. S. Hall, R.F.C. (Newton Heath, Manchester).
3116 Sjt. W. E. Smith, R.F.C. (Barnes Park, London).
48027 Pnr. W. T. Smith, R.E., attd. R.F.C. (Kensal Rise, London).
4400 Sjt. R. C. Taylor, R.F.C. (Willesden).

FROM THE COURT CIRCULAR.

Buckingham Palace, Oct. 19th.

The following officers then had the honour of being received by the King, when His Majesty invested them with the Insignia of Companions of the Orders into which they have been admitted :—

Bar to the Distinguished Service Order.

Wing Comdr. Arthur Bigsworth, R.N.

The Distinguished Service Order and the Distinguished Service Cross.

Flt. Lt. Basil Hobbs, R.N.A.S.

The Distinguished Service Order.

Flt. Comdr. Christopher Galpin, R.N.A.S.
Flt. Lt. Harwood Arnold, R.N.A.S.
Lt.-Col. Philip Joubert de la Ferté, R.A. and R.F.C.

* * *

The King then conferred decorations as follows :—

The Distinguished Service Cross and Bar.

Flt. Sub-Lt. Robert Dickey, R.N.A.S.

The Distinguished Service Cross.

Flt. Comdr. Clarence Maclurin, R.N.A.S.
Observer Lt. Russell Gow, R.N.A.S.
Observer Lt. Eric Betts, R.N.A.S.
Flt. Lt. George Simpson, R.N.A.S.
Flt. Lt. Robert Leckie, R.N.A.S.
Flt. Sub-Lt. Lacey Glaisby, R.N.A.S.
Flt. Sub-Lt. Arthur Simms, R.N.A.S.
Warrant Officer, 2nd Grade, Frank Whitmore, R.N.A.S.

The Military Cross.

Capt. Noel Barraclough, R.F.C.
Capt. Charles Holland, R.F.C.
Sec. Lt. James Mansfield, R.I. Fus., attd. R.F.C.

Buckingham Palace, Oct. 20th.

The following had the honour of being received by the King, when His Majesty invested them with the Insignia of Companions of the Orders into which they have been admitted :—

The Distinguished Service Order and Bar.

Flt. Comdr. Robert Little, R.N.A.S.

The Distinguished Service Cross.

Flt. Comdr. John Brooke, R.N.A.S.
Flt. Comdr. Herbert Travers, R.N.A.S.
Flt. Lt. Walter Williams, R.N.A.S.
Observer Lt. James Kerry, R.N.A.S.

The Military Cross and Bar

Capt. Anthony Wall, Middlesex Regt. and R.F.C.

The Military Cross.

Capt. Rupert Atkinson, R.F.C.
Capt. Roderick Keller, Royal Warwickshire Regt. and R.F.C.
Capt. Kenneth McCallum, Argyll and Sutherland Highlanders and R.F.C.
Capt. Henry Rushforth, Gen. List and R.F.C.
Lt. Robert Hamilton, Highland Cyclist Battalion and R.F.C.
Lt. Lionel Baker-Jones, Welsh Regt. and R.F.C.
Lt. Richard Jones, Gen. List and R.F.C.
Lt. Esmond O'Hanlon, Gen. List and R.F.C.
Lt. Thomas Pearson, R.F.A. and R.F.C.
Sec. Lt. William Cook, New Zealand Forces and R.F.C.
Serjt.-Maj. Charles Kernot, R.F.C.

NAVAL.

The following appointments have been made in the Royal Naval Air Service :—

Oct. 19th.—Flt. Comdr. C. W. H. Pulford promoted to actg. sqdn. comdr., with seny. Oct. 17th.

Chief P.O. H. Leedham granted a temp. commission as lieut., R.N.V.R., with seny. Oct. 18th.

Oct. 20th.—Mr. B. G. McCormick granted a temp. commission as Lieut., R.N.V.R., to-date October 19th.

Admiralty Communiqués.

Oct. 16th.—A considerable number of patrols were carried out yesterday by naval aircraft, in the course of which several enemy aeroplane formations were encountered. Two of the enemy machines were driven down. One of our machines is missing.

During the 24 hours bombing raids were carried out on the following objectives :—Bruges docks, Varssenaere aerodrome and Houttave aerodrome (the last two respectively north-west and south-west of Bruges).

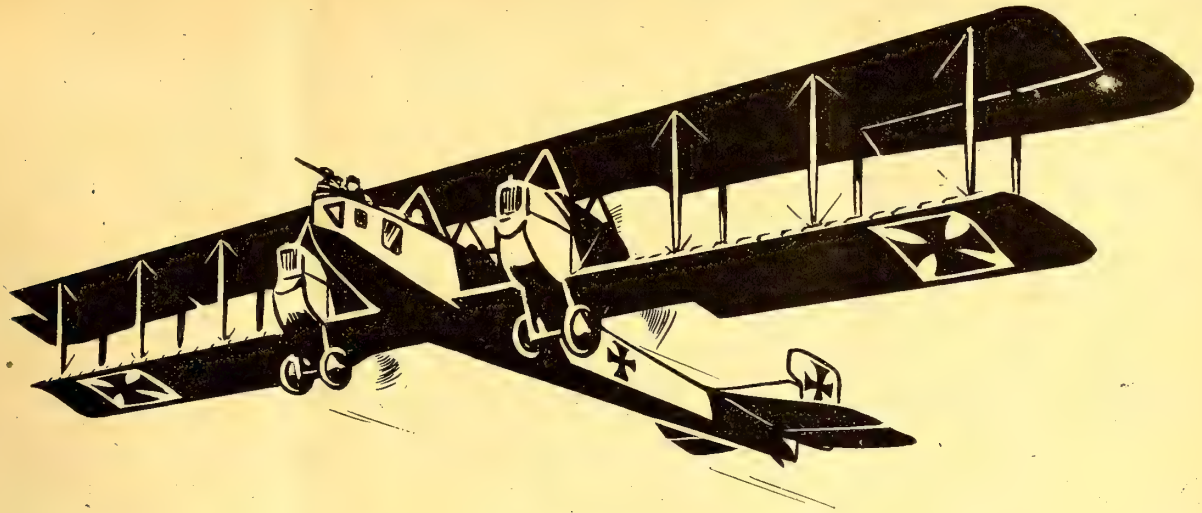
Large quantities of explosives were dropped with good effect, all our machines returning safely.

Oct. 17th.—On the night of Oct. 15th-16th a bombing raid was carried out by naval aircraft on Bruges Dock, on which objective many tons of bombs were dropped.

During Oct. 16th one of our fighter patrols brought down a two-seated enemy machine in the vinicity of Zarren. The observer was seen to fall out, and the machine turned over and fell, on fire.

All our machines returned safely.

Oct. 18th.—During the day (Oct. 17th) patrols were carried out by the Royal Naval Air Service, several enemy formations being encountered. One enemy seaplane was brought down and



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seen to crash, while two other enemy machines were probably destroyed.

Oct. 19th.—On the morning of the 18th inst. a bombing raid was carried out by naval aircraft on Varssenaere aerodrome (south-west of Bruges). Many bombs were dropped with satisfactory results.

All our machines returned safely.

Oct. 21st.—On the night of October 19th and during the morning of the 20th, bombing raids by naval aircraft were carried out on the following military objectives:—Bruges Dock, Engel aerodrome (north-west of Thourout). A fire is reported to have broken out at the latter place.

Large quantities of explosives were dropped.

All machines returned safely.

Oct. 22nd.—At about noon on October 21st, raids were carried out by naval aircraft on Vlisseghem aerodrome and on Houttave aerodrome (respectively north-east and east of Ostend). The bombs appeared to burst accurately.

Both during the raids and on the return our bombing machines were attacked by enemy aircraft, two of which were shot down completely out of control. Our bombers all returned safely.

During offensive and reconnaissance patrols five of our scouts engaged about 20 hostile scouts, two of the latter being destroyed and two driven down completely out of control.

One of our pilots is missing.

The Casualty List.

Reported Oct. 19th.

Missing.—Oakley, Flt. Sub-Lt. W. E. B., R.N.

Wounded.—Binks, Flt. Sub-Lt. A. J., R.N.

Sutherland, Flt. Sub-Lt. I. F., R.N.

Accidentally Injured.—Towers, Flt. Sub-Lt. G., R.N.

Campbell-Orde, Flt. Sub-Lt. A. C., R.N.

Previously reported Missing, now reported Prisoner of War.—McMillan, Flt. Sub-Lt. R. E., R.N.

Reported Oct. 22nd.

Accidentally Injured.—Waistell, Flt. Lt. A. M., R.N.

Previously reported Missing, now reported Killed.—Haines, Obs. Sub-Lt. C. L., R.N.

Previously reported Missing, now presumed Killed.—Hodges, Flt. Sub-Lt. C. R. W., R.N.

PERSONAL NOTICES.

Death.

BARON.—Flt. Sub-Lt. Maurice Nelson Baron, R.N., who was previously reported missing, and is now reported killed in action on August 15th, was the eldest son of Canon and Mrs. Baron, Alford Vicarage, Lincs. He was 18 years of age.

Engagements.

GOLDING—PEACOCK.—An engagement is announced between Flt. Lt. M. J. Golding, R.N.A.S., youngest son of Mr. and Mrs. Golding, Kneller, Feltham, Middlesex, and Jeannee Peacock, third daughter of Mr. and Mrs. Peacock, Pellisson House, Redcar.

MEADE—RICCARDI-CUBITT.—A marriage has been arranged, and will shortly take place between Flt. Lt. William Abbott Meade, R.N., only son of Mr. and Mrs. Meade, of Woodbury, Surrey, and Vera, eldest daughter of Lieut. Count and Countess Riccardi-Cubitt, of Eden Hall, Edenbridge, Kent.

SHOVE—BARKER.—An engagement is announced between Staff Paymaster Cyril A. Shove, R.N., secretary to the Director of Air Services, son of the late Arthur W. Shove, Lee, London, and Blanche Delmege, daughter of the late Col. Arthur Barker, A.M.S., 144, Harley Street, and Mrs. Arthur Barker, Clive Lodge, Albury, Surrey.

Marriages.

BUMPUS—RANKEN.—On October 19th, at Putney Presbyterian Church, Upper Richmond Road, Putney, Lt. F. A. Bumpus, R.N.V.R. (attd. R.N.A.S.), third son of Mr. and Mrs. A. A. Bumpus, of Park Road, Loughborough was married to Mary, daughter of Mr. John Ranken, of Lytton Grove, Putney, by the Rev. John Cochrane.

COTTON—MACLEAN.—On Oct. 16th, in London, Frederic Sidney Cotton, ex-Flt. Lt., R.N., eldest son of Mr. and Mrs. A. J. Cotton, of Grandchester, Queensland, was married to Joan Movaren Maclean, only daughter of Alick and Josey Maclean, granddaughter of the late Charles Donald Maclean, Indian Civil Service, and William J. Dickson, Minister H.M. Diplomatic Service.

HAVERS—DANIELS.—On the 16th, at St. Bartholomew's Church, Sydenham, Flt. Lt. John W. Havers, R.N., eldest son of the late W. J. Havers, barrister-at-law, and Mrs. Havers, of Thelton, Arundel, was married to Winifred Rosabel, eldest daughter of Mr. and Mrs. Daniels, of Wykeham, Sydenham, by the Rev. Mr. Boyne-Bunting, assisted by the Rev. P. T. Andrews, of Lyminster, Sussex.

Birth.

PEGG.—On October 19th, at Beechwood, Dundee, Lorna (née Cox), the wife of Sub-Lt. John Pegg, R.N.V.R., attd. R.N.A.S., of a son.

Details of a series of adventures which befell Flt. Comdr. Edwin Roland Moon, D.S.O., R.N., of Southampton, who was at first reported killed in East Africa, but who is now a prisoner in the hands of the Germans, and Comdr. the Hon. Richard Bridgeman, D.S.O., R.N., who lost his life, have been received:—

It appears from the story of a captured German merchant captain and from native sources that a seaplane carrying the two officers was forced to land in the delta of the Rufigi River owing to engine trouble. As they could not repair the damage the officers burnt their machine. Flt. Comdr. Moon swam across a stream which swarmed with crocodiles with a view to finding a boat or canoe, but failed in his quest. On the following day he again crossed the river, but was carried down stream by the ebb tide before he could land, and had to force his way back through the mangroves.

Apart from cocoanuts the officers had had nothing to eat or drink since leaving their station. At nightfall, after much weary marching, they discovered an empty house, and were able to make a raft on which they set off. Their only relief from mosquitos was to dip their heads under the water. The cocoanut milk which they carried in bottles had turned sour by this time, and by the evening of the third day both were completely exhausted. Comdr Bridgeman, indeed, was almost insensible.

The tide carried the raft out to sea and the raft became waterlogged, so that Flt. Comdr. Moon had to support his comrade in his arms in order to keep the almost unconscious man's head out of the water. The two spent 13 hours on the raft on the fourth day, and for at least nine hours were on the open sea. Again and again Comdr. Bridgeman was washed off the raft and rescued again by his brother-officer, until at last he died of exhaustion and exposure.

During the afternoon of the fourth day the tide carried the raft back to within a short distance of the shore, and the survivor managed to regain the land. In his final struggle to shore, his face, hands, and feet were severely cut by the rocks. A native conducted him to two Germans who were living near, and there he collapsed. He soon recovered, however, and is now quite well.

Comdr. Bridgeman's body was washed ashore a few days afterwards and was buried by the Germans.

* * *

The following descriptions of further incidents in the campaign being waged against enemy submarines taken from official records have been issued for publication:—

One of the coastal airships, of a type familiar to visitors at seaside resorts, was recently on patrol, and sighted a steamer in distress. On descending closer to investigate, it was found that she had been torpedoed by an enemy submarine, but was capable of being towed into harbour. The airship summoned assistance by wireless, and until it arrived hovered protectingly round the crippled merchantman. No signs of her late assailant were visible, and in due course the steamer was taken in tow by tugs and headed for harbour. The aerial escort accompanied the tow, and about an hour later sighted the conning tower of a submarine about five miles to the south-eastward of the convoy, apparently manœuvring for another shot.

The airship instantly signalled by wireless the position of the submarine to all men-of war in the vicinity, and swooped down to attack. The submarine saw her coming, and dived, but too late. Two bombs were dropped simultaneously in front of the swirl of his descent; a violent explosion ensued, followed by oil and air-bubbles in ominous quantities. Shortly after a destroyer arrived and investigated with sweeps. The airship, returning to her base for a further supply of bombs and petrol, was overtaken by the aerial signal: "You've undoubtedly bagged him."

On a subsequent occasion this same airship, while flying in company with a west-bound convoy of merchantmen, sighted the track of a torpedo, and a moment later observed a great column of water shoot up alongside one of the steamers. A submarine, relying on the state of the sea for concealment, had with great daring dived beneath the armed escort and torpedoed her victim under their noses. The weather at the time was bad, and rapidly getting worse; the airship shot down and along the track of the torpedo at a speed of 90 miles an hour, and at the end of the track sighted the outline of a submerged submarine, which, her deadly work done, was leisurely proceeding westward. The airship turned and released her bombs while she hovered above, and the explosion was followed by a great upheaval of air and air-bubbles. A calcium flare was dropped to mark the spot, and armed patrol vessels, summoned by signal, made assurance doubly sure with explosive charges. The airship returned to her base in the teeth of a head gale, and landed with the wind blowing 45 miles per hour.

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MILITARY.

G.H.Q. Communiqués.

Oct. 16th, 9.15 p.m.—During the morning of the 15th inst. much successful artillery work was accomplished by our aeroplanes. Many photographs were taken and the enemy's infantry were harassed with machine-gun fire from low altitudes.

In the course of the day two tons of bombs were dropped by us on a large German ammunition dump near Courtrai and on hostile billets and hutments in the battle area. A number of bombs were dropped by night also on various targets in the enemy's forward areas.

In air fighting three German machines were brought down and two driven down out of control.

Three of our machines are missing.

Oct. 17th, 10.15 p.m.—British aeroplanes carried out a very successful bombing raid this afternoon into German territory.

A factory west of Saarbrücken, some 40 miles beyond the German frontier, was attacked. Many bombs were dropped with good effect, and fires were seen to break out in the factory.

All of our machines returned safely.

On the 16th instant our aeroplanes took advantage of the fine period from dawn till 3 p.m. to carry out artillery work and photography. A large number of bombs, also, were dropped during the day on hostile billets, hutments, and trenches.

Two German machines were brought down in air fighting, and one other was shot down by our anti-aircraft guns.

One of our machines is missing.

Oct. 18th, 9.8 p.m.—On the 17th inst. fine weather produced great aerial activity. Visibility was excellent, and enabled our machines to do a great deal of successful artillery work and photography.

Ninety-eight bombs were dropped by our aeroplanes during the day on the enemy's billets and hutments.

The strong west wind and clear atmosphere were ideal for the enemy's artillery reconnaissance and fighting machines, which were active and very aggressive in the forenoon.

Several flights were made at high altitudes over our lines, with the result that of the enemy machines brought down by our aeroplanes, three fell in our territory.

In all, 11 German machines were brought down by us, including one shot down by anti-aircraft gun fire, and four others were driven down out of control.

Three of our machines are missing.

Oct. 19th, 9.10 p.m.—Reconnaissances, artillery work, and photography were carried out by our aeroplanes, and in the course of the day two and a half tons of bombs were dropped on a large gun position near Douai, on railway sidings near Ghent, and on various hostile billets and hutments.

At night a further ton of bombs were dropped by us on Courtrai Station and on the German aerodrome in that vicinity.

In air fighting six hostile machines were brought down and four were driven down out of control. Another German machine was shot down by anti-aircraft gun fire.

Seven of our machines are missing.

Oct. 20th, 9.2 p.m.—On the 19th. inst. dense mist almost entirely prevented aerial work. A little artillery work was carried out by our aeroplanes, and 50 bombs were dropped by us on various targets.

There was very little improvement in the weather during the night, but a few bombs were dropped on a hostile railway station.

No fighting took place during the day.

Oct. 21st, 9.17 p.m.—In spite of very misty weather a further attack into Germany was carried out by our aeroplanes this afternoon.

A foundry and railway junction ten miles north-west of Saarbrücken were bombed, over a ton of bombs being dropped.

Very good results were observed, and bursts were seen on the foundry and railway station. A big explosion took place.

Many hostile scouts attacked the bombing squadrons over the objective, and four were driven down out of control. Photographs were taken by us.

All our machines returned except one.

On the 20th inst. the weather was very fine, but a thick haze prevented observation for artillery by our aeroplanes.

During the day bombing operations were carried out by us vigorously, and a total of 238 bombs were dropped on the enemy's aerodromes at Gontrode and Roulers, on Cortemarck station, and on hostile billets and hutments.

One of the aerodromes at Roulers was bombed from a low height, and one bomb was seen to hit and blow to pieces a German machine on the ground, while another fell through the centre of a hangar.

The enemy's personnel and machines on the ground were then attacked with machine-gun fire from our aeroplanes.

During this bombing attack our scouts operating in the neighbourhood brought down seven German machines, which crashed in full view of their aerodrome.

At night the enemy's aerodromes were again attacked, and a ton of bombs were dropped on Ingelmünster aerodrome and railway station, and on the aerodromes at Courtrai. At one of these a direct hit was obtained upon a hostile machine which was endeavouring to leave the ground.

In the course of the day a total of nine German machines were brought down, and four were driven down out of control.

Three of our machines are missing.

Oct. 22nd, 9.34 p.m.—On the 21st instant the fine weather continued, and the improvement in visibility enabled a great deal of artillery observation work and photography to be done.

During the day a total of four tons of bombs were dropped by our aeroplanes on aerodromes near Courtrai and Roulers, on a large gun position near Douai, on billets east of Lens, and on other targets in the battle area.

At night nearly three tons of bombs were dropped by us on Roulers and Lichtervelde railway stations, where fires were started, and on hostile aerodromes in the vicinity of Courtrai and Roulers.

One of our pilots arrived at a German aerodrome as the enemy's night bombing machines were getting off and dropped his bombs amongst them.

Heavy fighting took place in the air, chiefly well over the enemy's line.

Twelve hostile machines were brought down, and three others were driven down out of control. Another German machine was shot down by anti-aircraft gun-fire

Eight of our machines are missing, including one which has not returned from night bombing.

The Naval Squadrons attached to the Army have been fighting throughout these operations, and accounted for a large share of the hostile machines brought down.

The Australian Squadrons, who up to the present have been training, have now commenced active work, and have already proved themselves worthy of the high opinion that was formed of them on their arrival.

War Office Communiqués.

Oct. 17th.—The G.O.C. the British Forces in Mesopotamia reports :—

On October 16th our aeroplanes dropped bombs on a Turkish aerodrome at Kifri, 50 miles north of Shahroban (and on the Turkish lines of communication to the Bagdad region), doing much damage.

On the return journey one of our aeroplanes was forced to land and had to be burnt, but the occupants were brought in by other machines.

Oct. 18th.—The G.O.C. British Forces in Palestine reports :—There is no change in the situation on the Palestine front. Two hostile aeroplanes have been brought down in our lines recently.

Information has also been received that early in the month Arab forces successfully raided the railway communications to the north of Medina (the Hedjaz Railway).

Home Command Communiqués.

Oct. 19th, 12.0 p.m.—Hostile airships attacked the Eastern and North-Eastern Counties this evening.

The enemy aircraft proceeded some distance inland over these counties, but did not carry out any very definite attack.

Six or seven raiders took part in the raid.

Bombs have been dropped at various points, including a few in the London area.

The raid is still in progress.

Oct. 20th, 12.15 p.m.—The latest police reports show that in last night's airship raid the following casualties occurred in all districts visited by the raiders :—

Killed, 27. Injured, 53.

Some material damage was caused to house property and business premises.

The Casualty List.

Reported Oct. 17th.

Killed.—Knight, Sec. Lt. G. H., R.F.C.
MacKay, Capt. J. I., D. of Well. R., attd. R.F.C.
Steward, Sec. Lt. A. A., R.F.A., attd. R.F.C.
Died of Wounds.—Armitage, Sec. Lt. E., R.F.C.
Wounded.—Johnston, Sec. Lt. J. E., Cyc. Bn., attd. R.F.C.
Missing.—Ainger, Lt. H. C., R. Scots, attd. R.F.C.
Fitzgerald, Sec. Lt. J. J., R.F.C.
Jeffs, Lt. C. H., Bord. R., attd. R.F.C.
Stevenson, Sec. Lt. J. G., R.F.C.
Walrond-Skinner, Capt. D. D., Mon. R., attd. R.F.C.

Reported Oct. 18th.

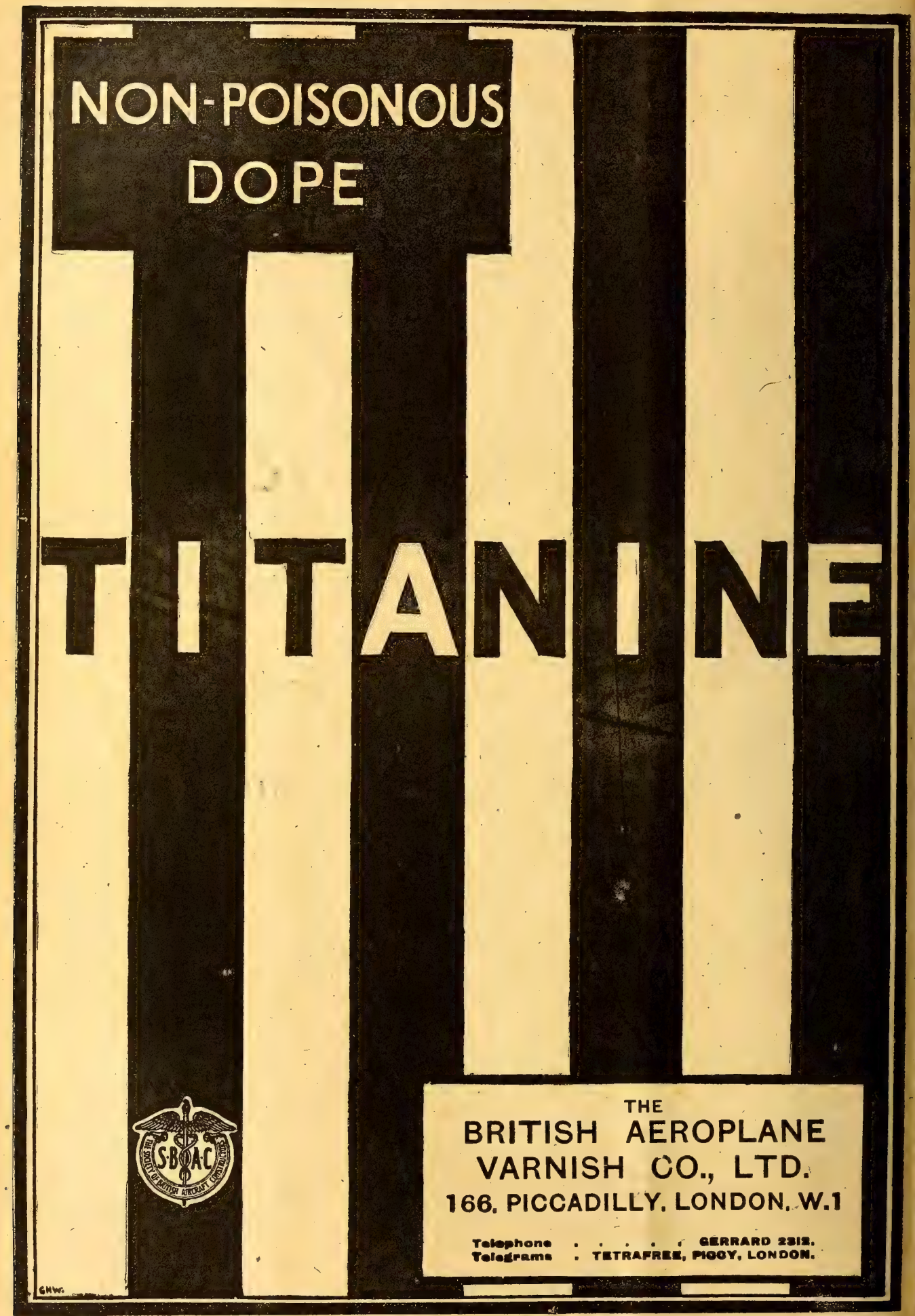
Killed.—Holt, Lt. H. G., M.C., R.F.C.
Lewis, Sec. Lt. E. P., R.F.C.
Previously reported Missing, now reported Killed.—
Gayner, Sec. Lt. W. J., Som. L.I., attd. R.F.C.
Honer, Lt. D. J., R.F.A., attd. R.F.C.

(*Continued on page* 1214.)



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The British Aircraft Industry.

BY CHARLES L. FREESTON.

XXVII.—HEWLETT AND BLONDEAU.

Old-timers will not need to be reminded of the fact, but for the benefit of those whose interest in aviation is synchronous with the war it may be explained at once that the above-mentioned title is unique. The senior partner of Hewlett and Blondeau is a woman—Mrs. Maurice Hewlett to wit—and one who has long since proved her business capacity as well as other remarkable qualities.

A Proud Record.

For Mrs. Hewlett is not only the first woman constructor of aeroplanes, but also holds the proud record of being the first Englishwoman to gain a pilot's ticket. The coveted brevet was earned so far back as August 29th, 1911, and was numbered 122; even as an aviator, therefore, apart from sex, Mrs. Hewlett may fairly be included among the noble band of pioneers. She learned to fly at Brooklands on a Farman biplane, and her instructor was Mr. Gustave Blondeau, who had learned to fly at Mourmelon, and in June, 1910, was awarded the 101st certificate issued by the Aero Club de France.

The First Brooklands School.

In partnership, Mrs. Hewlett and Mr. Blondeau scored another "first," for in 1911 they founded the first school of flying to be seen at Brooklands. Pupils were forthcoming almost as soon as the opening of the school was announced, and among those who graduated there were such well-known pilots as Lieut. Spenser D. A. Grey, R.N., Captain T. G. Hetherington, Lieut. Snowden Smith, the late Lieut. Cecil Marks, the late Mr. J. L. Longstaffe, M. Maurice Ducrocq, Mr. C. R. Abbott, and Mr. R. Graham Wood.



Mrs. Maurice Hewlett.

Mr. Blondeau's Career.

Mr. Blondeau himself is an engineer of sound and varied training. Born at Tergnier, near St. Quentin, in 1871, he gained his first mechanical experiences in the shops of the French Northern Railway Co., to which his father was works manager. At the company's technical school the son scored the premier place in the examinations, and after passing out he entered a sugar mill and gas-engine plant manufactory as draughtsman, and remained there until, at the age of 21, he was claimed for military service. After his two years' training with the Army he returned for another year to the gas-engine factory, and then became chief draughtsman to a big tramway building firm, and after three years was appointed chief erector, and travelled in that capacity through France, Belgium and Spain.

The Two-stroke Motor.

Becoming interested, however, in the petrol-driven engine as applied to motor-cars, he joined a firm of automobile constructors as draughtsman, to gain experience, and was eventually taken into partnership. He made a special study of the two-stroke motor, which at that time was regarded as adaptable to the dirigible balloon, and was being put through experiments by Colonel Renard, at the French Physical Laboratory at Meudon. While on this work Mr. Blondeau entered one of his cars in the Paris-Madrid race of 1903, and himself drove in the Circuit des Ardennes race of the same year.

The First Machine.

It was during the Blackpool Aviation meeting of 1909 that Mr. Blondeau interested Mrs. Hewlett in aerial developments, and together they formed a plan to obtain a machine and learn to fly. Mr. Blondeau went to Paris in the following December, and after investigations placed an order for a Henry Farman machine. In January he went to Mourmelon to study at the Farman works, and also secured a special permit for the same object in respect of the Gnôme engine works near Paris.

After he had learned to fly, however, as above stated, he had to wait until the following May for the delivery of his machine owing to the fact that a hurricane wrecked several of the Mourmelon hangars and destroyed a number of machines in various stages of construction. In the early days, as has already been seen in previous articles in this series, our pioneers had not only to experience vicissitudes in the air, but found the wind a potent enemy on the ground itself.

Mrs. Hewlett as Sportswoman.

Of Mrs. Hewlett's earlier career, it may be said that she is the daughter of the late Rev. George W. Herbert, vicar of St. Paul's, Vauxhall, and lived at Cavendish House, Clapham Common, where she was born, until the time when she married the well-known author, Mr. Maurice Hewlett, who was then a barrister.

Always fond of sport, she hunted in Worcestershire and rode and drove horses a good deal until the motoring era. Then she joined Miss Muriel Hind in a Singer tri-car non-stop run from London to Edinburgh, and they also took part in a six-days' reliability trial, and went through to the finish at John o' Groats. In the following year Mrs. Hewlett took her son on a similar journey in a Lagonda tri-car, which broke down, however, on the third day. Subsequently Mrs. Hewlett drove a 7-h.p. Panhard, and then a de Diétrich car, which is still preserved.

A Long Partnership.

When she became badly smitten with the desire to take up flying, her friends did their utmost to dissuade her from the project, and Mr. Hewlett even offered her a new motor-car as an alternative. She sold all her personal effects instead, however, and entered into a business partnership with Mr. Blondeau, which has been uninterruptedly successful in every respect.

At the first Brooklands flying meeting Mr. Blondeau was the only aviator to carry off a prize. Later on he built, under licence, a Farman racer, and this machine, piloted by Lieut. (now Colonel) Snowden-Smith, won the Brooklands to Brighton race for biplanes.

Learning under Difficulties.

Eventually Mrs. Hewlett aspired to pilot a machine with her own hands, but the process of learning was somewhat slow, not by reason of any deficiency on her own part, for she has good hands and a keen mechanical sense, but for the simple reason that machines were as rare so precious in those days, and had to be handled with extreme care lest a crash should leave the Brooklands school without the means of carrying on. Consequently she could only obtain lessons at odd moments, when the pupils themselves were not requiring the solitary Farman; but of such opportunities as were available at long intervals she made the best of uses, and qualified in due course.



M. Gustave Blondeau.

Another Record.

Then Mrs. Hewlett established another record—perhaps the most noteworthy of all. She taught her son to fly. She modestly disclaims the sole responsibility for this achievement, and states that Mr. Blondeau did the major portion of the tuition, but the fact undoubtedly remains that Mrs. Hewlett did take a part, and the spectacle of a mother initiating her son into the art of flying, and at a time when the number of men themselves who had qualified as pilots was extremely limited, is one of the most striking in the history of any movement.

As one result of this remarkable combination, Mr. Hewlett, junr., was one of the first pilots to leave England for the seat of war. He had already joined the R.N.A.S., and has since seen a good deal of active service, including the Cuxhaven raid, after which memorable episode he was missing for a week. His many exploits and long experience, in fact, have earned him the rank of Squadron Commander.

The First Works.

The Brooklands school was carried on for 2½ years. After building a Maurice Farman in the hangars Mr. Blondeau obtained an order for building Hanriots, and secured workshops in consequence at Clapham Junction. It is only bare justice to say that even in these early days the firm of Hewlett and Blondeau secured a reputation for high-class workmanship and have maintained it throughout.

After 2½ years at Clapham Junction, during which various types of machines had been built, the works proved too small, and could not be extended, but as Government orders were in hand, it became necessary to migrate to more suitable ground.

A Search for a Site.

The search for a site proved by no means easy, but was not without amusing incidents. One day the firm received a telegram asking them to meet an unknown gentleman and the Duke of Orléans. At first the message was regarded as a mistake, and the telegram was about to be returned to the post office, but it was suddenly realised that it might refer to the negotiations already on foot concerning a Thames riverside site. The telegram was followed up accordingly, and the meeting took place. Then it came out that the business on hand did relate to the Thames site, but at the outset the firm was met by the proviso that no factory could be erected on the estate, while occupancy of the land also involved the maintenance of a road that ran right through it.

The Leagrave Factory.

At length an undeveloped area of land was discovered at Leagrave, a village which lies between Dunstable and Luton. The chosen site was a cornfield, when in May, 1914, the work of building a new aircraft factory was begun, but before very long aeroplanes were in course of construction and, as a matter of fact, several were completed before the war began.

Since then the works have been constantly undergoing enlargement, and building has never stopped. The Omnia factory as it is called, extends over some nine acres of ground, and there is unlimited room for expansion. Meanwhile constructive work has proceeded uninterruptedly on both Admiralty and War Office orders. The plant is in every respect up to date, and the firm makes its own metal parts and is not dependent upon any other concern.

A Ministry School.

An interesting and unique feature of the establishment is a Ministry of Munitions School, in which about sixty girls at one time are trained in mechanical work. When their tuition is complete they are given a practical trial in the shops themselves, and if found satisfactory are drafted to whatever works are in need of them.

The Leagrave factory is the only one in which girls are systematically trained as aeroplane mechanics in a place devoted to aeroplane construction alone, with a view to being transferred elsewhere, and the Ministry of Munitions has been very pleased with the results attained.

The "Aeromnia Magazine."

Mention should also be made of the fact that a monthly magazine is published in connection with the works, under the name of the "Aeromnia Magazine," and is quite the most ambitious thing of its kind that has so far been seen. The September issue contained an amusing article entitled "The Reflections of Kroshka," Kroshka being a big Dane who is regarded as an indispensable feature of the establishment. Originally he be-



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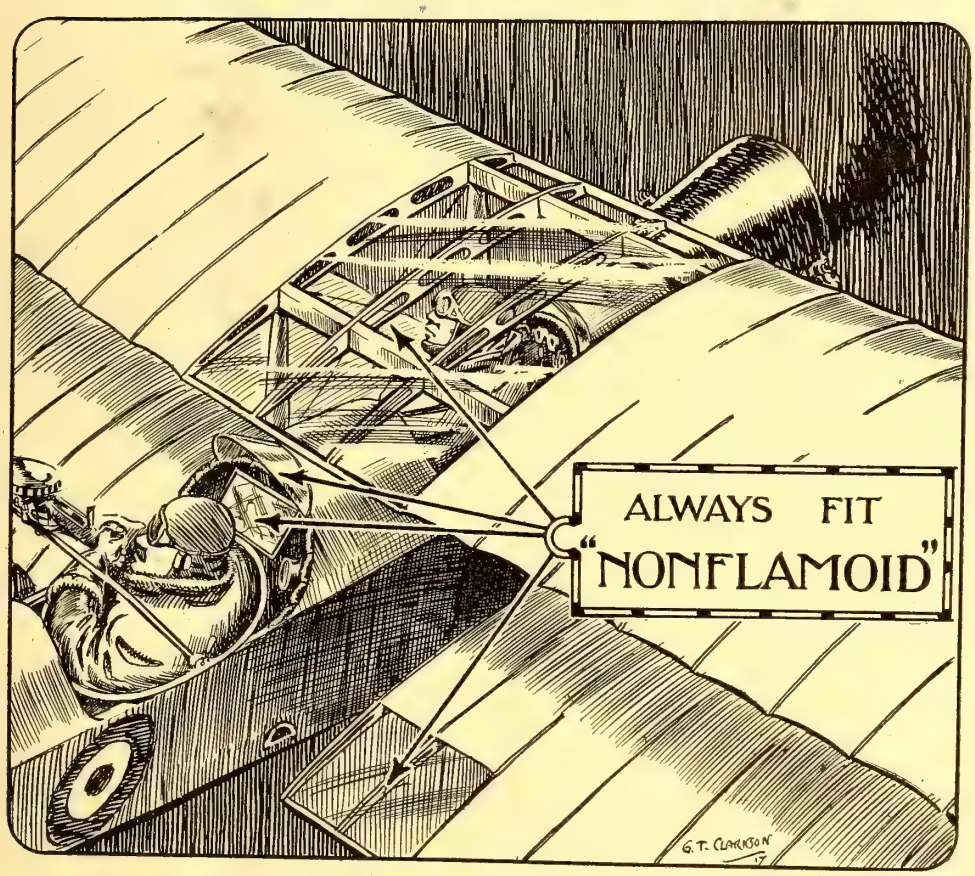
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longed to Major Gordon Bell in the early Brooklands days, but passed into Mrs. Hewlett's possession. He has visited every aerodrome and attended every big flying fixture and aero show, and his friends in the aircraft world are many.

Touring by Aeroplane.

As a pioneer pilot among women it mignt be supposed, perhaps, that Mrs. Hewlett was made of particularly stern stuff and had been addicted to hazardous feats. As a matter of fact, she tells me that she has never flown for anything but pure pleasure. At Brooklands she used a little machine with a 50-h.p. Gnôme, which was built for Lieut. Snowden Smith, whenever she had a chance of taking a trip on her own account.

Now she is looking forward to the time when, after the war, she may travel about on a small machine with a low-powered motor—she would not mind even a 35 h.p. Anzani—but with an enormous lift and folding wings, so that it could be put up anywhere, and be in no sense a source of worry. In other words, her ideal is to tour by aeroplane just as one would with an ordinary car. Big machines she regards as a war-time necessity, pure and simple, and believes that there will be a big demand for small craft after the war.

The Production of Aeroplanes and their Components

(Eighteenth Instalment.)

BY STEPNEY BLAKENEY.

Having installed the engine in position it is best to put an adjustable trestle underneath the nose of the fuselage in case the ropes which hold the tail end of the machine down give way. This incident has occurred before now, with disastrous results to the engine.

It will then be necessary to check the engine to see that it is in line with the line of flight, and, with the fuselage we have constructed. The line of flight will probably be that of the top longerons. It is from this line we must work, as it is our only base from which to start.

The engine which is being installed in this case is of a radial type and will, therefore, be fastened to the front and the back engine-plates, which are attached to the fuselage. Therefore, we must satisfy ourselves that the front engine-plate is truly at right-angles with the line of the top longerons. Also, the plate must be tested to make sure that it is transversely at right-angles with the centre line of the whole fuselage. Unless this is done, the engine and propeller will always have a tendency to look either to the left or the right, according to whichever side the engine-plate inclines.

The reason for this demand for accuracy is that the aeroplane is designed to fly normally in a dead straight line, and it will not do this if the engine is not fixed squarely and truly in the fuselage.

Petrol Connections.

The installation and the coupling up of the petrol and oil pipes must next be taken in hand. Before any pipe of any description is finally coupled up in its position, the pipe should be thoroughly tested, preferably under steam or air pressure, for strength and leaks, and also to make absolutely sure that there are no obstructions of any kind inside its whole length; this precaution is most necessary and cannot be too strongly impressed on all concerned; in fact, I consider that in view of the importance of this matter it should come under the inspection department.

The bending and the adjusting of pipes should only be done by workers who are skilled in this class of work, as dents and kinks of any kind should not be tolerated in the smallest degree, as it causes inefficiency in the whole system of piping Also all spelter should be carefully cleaned off, all brazed joints and the pipes generally should be finished off in a high-class workmanlike manner. Any deviation from this standard is undesirable.

The revolution counter, and the shaft for driving it, will next be required to be fitted and coupled up.

During the time that the pipes were being tried and fitted into position, the cowling over the engine should have been in the hands of the coppersmiths and panel beaters, and can now be fitted on.

Fitting the Cowl.

The engine cowl is generally made of about 22-gauge aluminium sheet, and is either pressed out, spun or beaten to shape.

In measuring up for the quantity of metal sheet required to make a cowl, it is just as well to measure round the outside circumference of the cowl on a sectional elevation. It should be borne in mind that the metal has to be pressed or hammered to this shape without distorting or thinning, although, of course, this does take place in a small degree, but it is not desired to a measurable extent.

Before proceeding with the final fixing of the cowling and aluminium fairing generally, it will be as well to fix the centre plane struts into their sockets on the top longeron of the fuselage, attach the centre plane to same, and put the bracing wires into position. This work requires the taking of careful measurements, and the accurate adjustment of the fork-ends, so that an equal tension on each strut and bracing wire will be assured. Excessive tension is not required, as this only puts additional work onto the struts and fittings, and they are only designed for a certain load, which it is not desirable to exceed. When putting in the bracing wires, the insertion of the split-pins and bolts should be left over, in case any alteration has to be made in the tension or position of any bracing or fitting or bolt.

Assembling the Main Planes.

The assembling of the main planes can be done in two ways, namely, by attaching one, say, right-hand or left-hand top wing first, using a trestle to support it, and attaching the bottom wing on the same side afterwards, supporting this also on the trestle, until the interplane struts and lift wires are put in and adjusted to both wings.

The alternative method is to stand both wings on their leading edges and then put the interplane struts into their respective positions, together with the bracing wires, and tighten up the whole lot just sufficiently to hold them together. Then the wings can be carried by the erectors to the machine and attached as a whole with the aid of a couple of pairs of tall steps.

With reference to the above methods, there are advantages and disadvantages in them both, and it may be as well to give them consideration, to save waste of time and difficulty to those who have not had the experience of erecting wings on finished machines.

As regards the first method, it can be recommended for the use of erecting shops where there is a lack of skilled men used to handling aeroplane wings; secondly, it enables the erectors in the case of a new machine to set the wings up truly to the correct dihedral angle and angle of incidence at the same time, and to measure up the correct lengths for the bracing wires after the struts have been tried up and fitted to their permanent positions.

Wiring Lengths.

With regard to the last reason, of course, the mathematician will naturally come along and say that it is possible accurately to calculate the length of any side of a triangle, and that, as he is able to do this, the practical advantage which I have set forth is of no use, and need not be taken into account. I quite agree that his statements are perfectly correct, up to a point, and the point is, that the mathematical calculations do not tell one what effect the tightening of the bracing wires will have on the structure as a whole, or how much one bay will contract at the expense of another expanding, and because the mathematician has calculated to five places of decimals that a lift wire will be, say, 7.61500 ft. long, it most probably happens, when the machine comes into the hands of the skilled erector who is responsible for tuning up the machine for her test flight, that the required length of the lift wire will be found to be, say, 7.54 ft. long, the loss of 0.075 in. being due to the various struts bedding together under the strain and tension required in a machine tuned up for flight.

These remarks, therefore, emphasise the necessity for allowing an ample margin for adjustment in wires. Also, screw threads should not be too short, and under no circumstances should streamline wires, which are exceedingly difficult to get at the present time, be cut by irresponsible workers, without authority.

The disadvantages of erecting wings separately is that it entails more trouble in having to have high pairs of steps for the men to get up to the top wing to fix up the struts and attach the bracing wires, and it is sometimes awkward to drill split-pin holes when perched upon the top of a pair of steps about 10 ft. high. Also, there is the expense of the trestles.

With regard to the second system: this method works well in the hands of experienced erectors, either in the works or out in the hangar, when erecting a machine which has just arrived from the makers at the flying ground, as it saves time and trouble in having trestles and long pairs of steps and planks, and all split-pins can be fitted on the ground. The disadvantages are, that this method is only suitable for the erection of wings onto machines which have been previously assembled, as it does not enable accurate dimensions of bracing wires to be taken.

(To be continued.)

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Quantity Production.

"Aerial Age," of New York, July 9th, publishes the following notes on production of aircraft in quantities. They should be of interest to the British Aircraft Industry :—

Quantity production is now the one important thing—the one thing over which there must be no loss of time, no confusion or squabbling. In fact, the situation is so serious that there must be no waste of time in considering unproven theories, details which fastidious theorists are apt to bring up, and there must positively be no waste of time in squabbling over matters of departmental jurisdiction or misunderstandings. There is no time for misunderstandings.

The Seven Most Important Factors in Quantity Production of Aircraft.

Coming down to details of producing aeroplanes in large quantities, there are some essentials which must be defined, else there will be confusion. The seven most important factors in producing aircraft in large quantities are as follows :—

(1) Placing Orders for Continuous Deliveries over a Period of Three Years.

To make it possible for manufacturers to develop their production facilities in proportion with the needs, the Government must place orders for aircraft extending over a period of three years, the types of machines to be built to be subject to change, but the orders not to be subject to cancellation, except in the event of the war ending, when the Government may cancel the orders, indemnifying the manufacturers for any losses involved. As the Government has it in its power to limit the profits and regulate the operation of factories, the Government will not be involved in losses in adopting a three years' programme of construction. In this way it can build an efficient and sufficient manufacturing machinery which will make it possible to turn out the thousands of aeroplanes needed to give the Allies the balance of power.

(2) Adoption of Standard Types of Machines and Motors.

Types that have already been proven successful should be adopted and produced without attempting any changes until better types have been developed in the experimental department.

To train the thousands of aviators in France, England, Canada, as well as in the United States, there will be needed thousands of machines of the "penguin" type, and tens of thousands of the advanced training type. The Allies have already agreed on the adoption of the Curtiss J-N type for advanced training, and will need tens of thousands of these. Then there are needed thousands of training machines for the training of naval aviators, and tens of thousands of the small combat type; of the large three-passenger armed machines now being used for photography, "spotting" artillery fire, reconnoitring, and other purposes; and of the very large bombing machines capable of making long distance raids. For the naval operations there will also be needed thousands of medium sized machines for aerial coast patrol work and for long distance bombing raids, as well as large torpedo-planes and seaplanes for long distance bombing raids.

(3) Experienced Aeronautic Engineers and Aeronautic Constructors.

Experience in aeroplane building is a most valuable factor, and every aeroplane plant that has manufactured aeroplanes, no matter how small the production, should be given orders large enough to permit expansion of manufacturing facilities to the fullest extent.

(4) Experienced Men in Quantity Production are Needed to Create Large Sources of Supply for Aircraft.

To avoid the failures experienced by large production firms, who have taken up the manufacturing of aeroplanes and motors in the past, arrangements should be made to combine the experienced aeronautic talent and the experienced production talent. Manufacturing facilities without aeronautic manufacturing experience will result in failure in efficiency, just as aeronautic engineering experience without quantity production experience will fail in production.

(5) Labour.

The American aeronautic industry to-day has more trained labour than the British aeronautic industry had in the beginning of 1914, and it should be possible to dilute this trained labour with untrained men and women to take care of the large aerial programme now under consideration. In aircraft manufacturing the employment of untrained labour not properly supervised by experienced men spells disaster, and means deaths of aviators.

(6) Materials and Supplies.

There may be an excuse for our not having dry lumber, aeroplane cloth, and other materials needed for aeroplanes at present, but there will be no excuse if we do not have it in six months from now. The seriousness of the situation forbids that we allow the important work of securing materials and supplies to be delayed, and it will avail nothing to the country or to the cause of the Allies to give excuses or justifications for not having the materials and supplies on hand when they are needed. For instance, there are hundreds of millions of feet of spruce available, but it has to be properly dried, and it would be too much to ask of lumber dealers to undertake to dry it and get it ready for aircraft manufacturing if the Government does not consider it necessary to take steps to give reasonable assurance to the dealers that the lumber will be used.

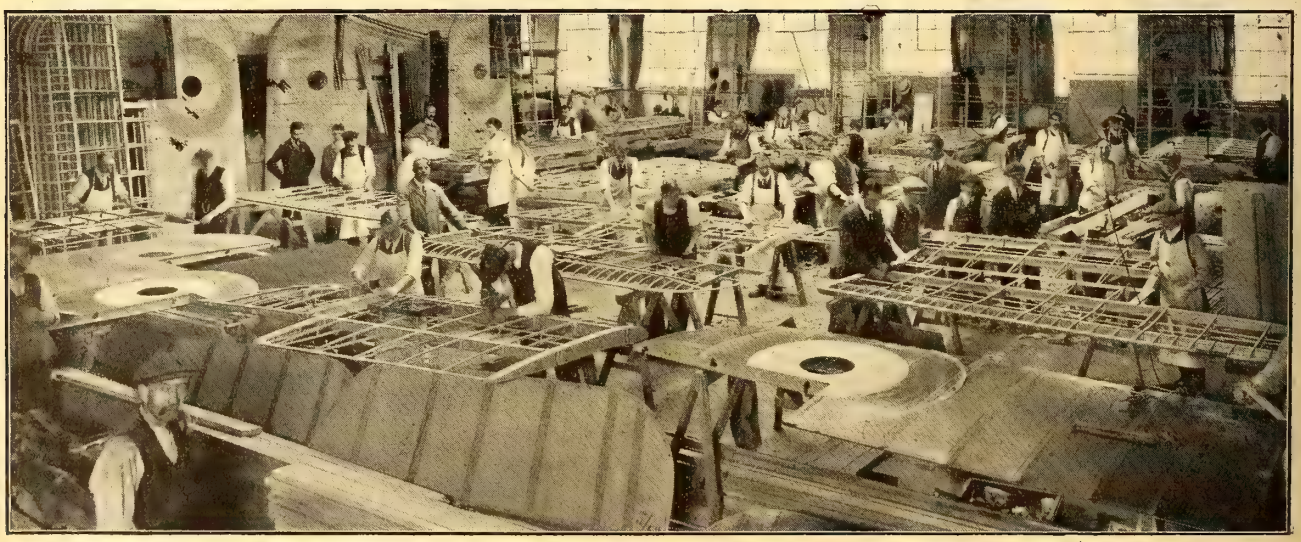
(7) Manufacturing Facilities.

Manufacturing facilities for aeroplanes are available to a tremendous extent, but not so much for the manufacturing of motors, metal parts, etc. Buildings and machinery are costly, and take some time to get. Manufacturers should be given assurance of orders immediately so that they may be able to get manufacturing facilities.

It is well to repeat that the one essential thing to ensure quantity production is the one thing which only the Government can supply, and which it never before did supply, and that is large orders for aircraft extending over a definite period, for the largest production possible, but without penalisation of manufacturers or red tape obstacles

The orders must extend over a definite period of time and every effort must be made to prevent the waste of manufacturing facilities such as there has been, due to the fact that new orders are seldom given until other orders have been completely filled. This practice of waiting until an order has been completed before giving another order forces a manufacturer into practical idleness for a period of time that has often extended to weeks, involving an irreparable loss of production to the country, and a serious financial loss to the manufacturer.

For instance, owing to lack of funds, the aeroplane manufacturers have been kept practically idle for the past two months, having no Government orders—although the entire country and

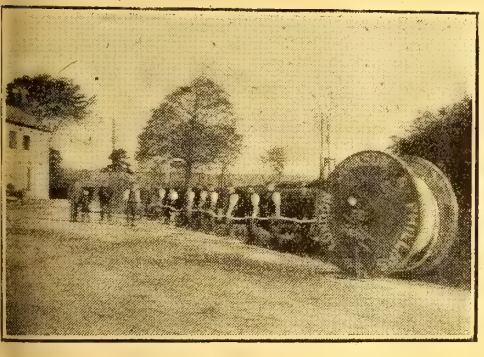


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our Allies know that the number of aeroplanes which have been lost thereby may mean the difference between victory and defeat. This may not happen again. Every manufacturer who can turn out aeroplanes, no matter how limited his present resources, should be given orders to manufacture either the machine which he is producing, or the type adopted by the Army and Navy, the orders to be large enough to enable him to expand his facilities. This should be done with every manufacturer of aeroplanes, motors, dirigibles, balloons, propellers, and parts.

Penalising the manufacturers for failures on time deliveries must be abolished, as it has been abolished in Europe. Supposing a company that has been given an order for 10,000 aeroplanes delivers 90 per week instead of delivering 100. It certainly should not be penalised for that. Those in charge must realise that every manufacturer is as much part of the national machinery as the officers of Federal Departments themselves, and whereas profits are to be limited the Government must protect the manufacturer against losses. Unless this is done the manufacturers will find it necessary to curtail their expenses or quit business, either of which means loss of production to the Government.

As to profits, the American Government should follow the example of the British Government and give every opportunity to the aeroplane manufacturers who have been developing aeronautics at a deficit for so many years, to make up for their past losses.

[Don't British aircraft constructors wish they had such opportunities?—Ed.]

The British and French Governments very justly and wisely also give an opportunity to every small aeroplane manufacturer to develop his facilities. In many cases manufacturers who were barely capable of turning out one machine per week, were given orders for several hundred aeroplanes, to be built on Government specifications, and that enabled them to develop large factories in a minimum period of time.

In the training of aviators, the saving of time is also most important. Sufficiency is the first element of efficiency, and to get sufficiency in aviators means that the training schools must be kept going every minute between sunrise and sunset. There must positively be eliminated that waste of time due, for instance, to not having an extra shift of mechanics to get the machines in order after the day's flying is over, to have them ready for the following morning. Unless this is done, the best part of the day is lost in waiting for the repairing and tuning of aeroplanes which were used and put out of order the day before. As fair weather cannot be purchased, every minute of fair weather must be used for training—and reasonably bad weather can be used for advanced training, so that military pilots may be able to fly under war conditions.

Two things should be emphasised: (1) That for warfare there are being used more and more large machines; (2) That the exigencies of war require that everything be done to encourage invention. Therefore, a premium should be placed on developing more efficient machines, and nothing should be done that would stifle invention. This war is on such a tremendous scale that 20,000 machines of any one type can be used effectively even if a better machine should be developed in the meantime; but the actual control of the air may always depend on 20 per cent. of the machines employed being more efficient than the enemy's machines, whether they be large air cruisers carrying a number of gunners or small fighting machines carrying a single gunner. Invention should be encouraged so that the Allies may always have the most efficient aeroplanes with which to clear the sky of German aviators to permit the other 80 per cent. of the aeroplanes to operate unmolested, and the large torpedoplanes and bombing machines needed for major operations.

Vibrational Effects in Metals.

SOME MINUTE CHANGES.

Written and Illustrated by JAMES SCOTT.

It is somewhat difficult to trace the effects of vibration in ordinary circumstances, since they are then of a temporary character. Beyond a certain point, however, they become permanent, or progressive, and are then conspicuous, when properly examined through the microscope.

It is necessary to remember that all metals and alloys consist of various sized, yet collectively minute, recognisable particles, with a tendency to crystallise in a definite manner, according to their respective origins. They are held together by the force of cohesion, which may be mechanically or chemically disturbed to such an extent that it is largely superseded by that of adhesion. The two terms have, when broadly considered, a highly contrasting significance. In cohesion the molecules are bound together integrally by a power which resists outside influence up to a given degree; whereas in adhesion the separate items are simply stuck together by a joining medium. Cohesion is tested by the tensile stress beneath which it yields to the point of fracture. Adhesion resembles the uniting of two panes of glass pressed face to face. But the two forces really grade one into the other, and necessitate intricate testing to satisfactorily determine, except in prominent examples.

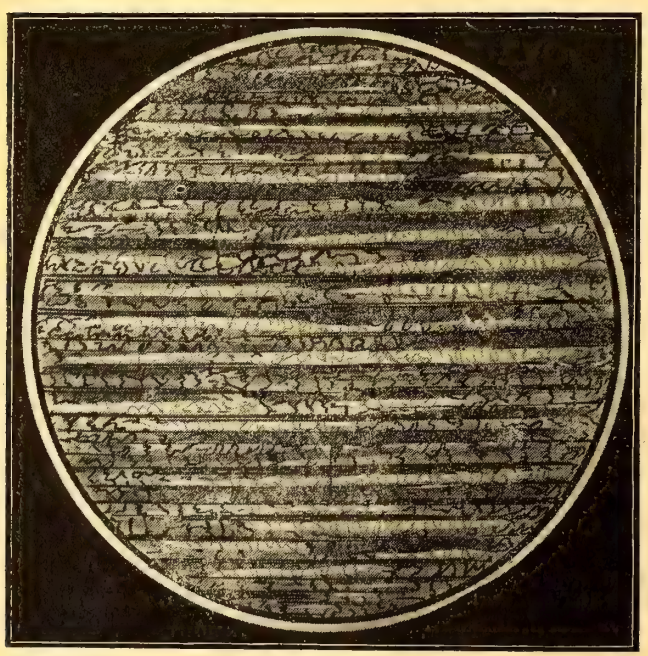


Fig. 1.—A space about 1/30 inch wide, magnified, showing parallel combinations of grains, due to vibration in ordinary steels.

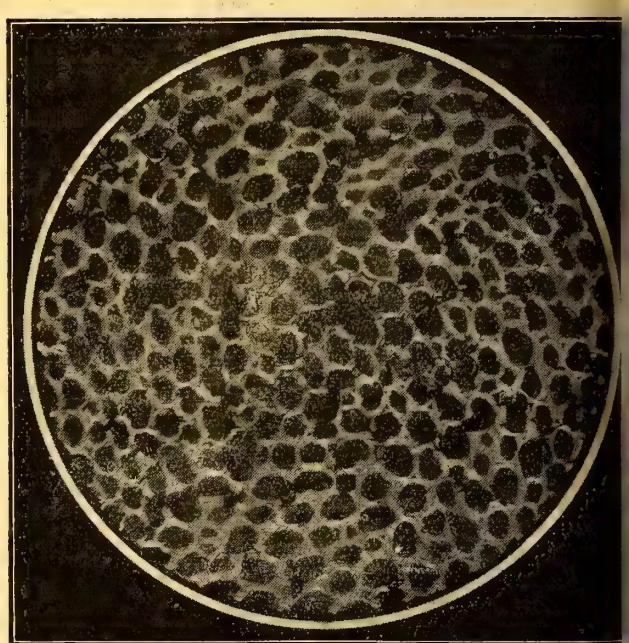
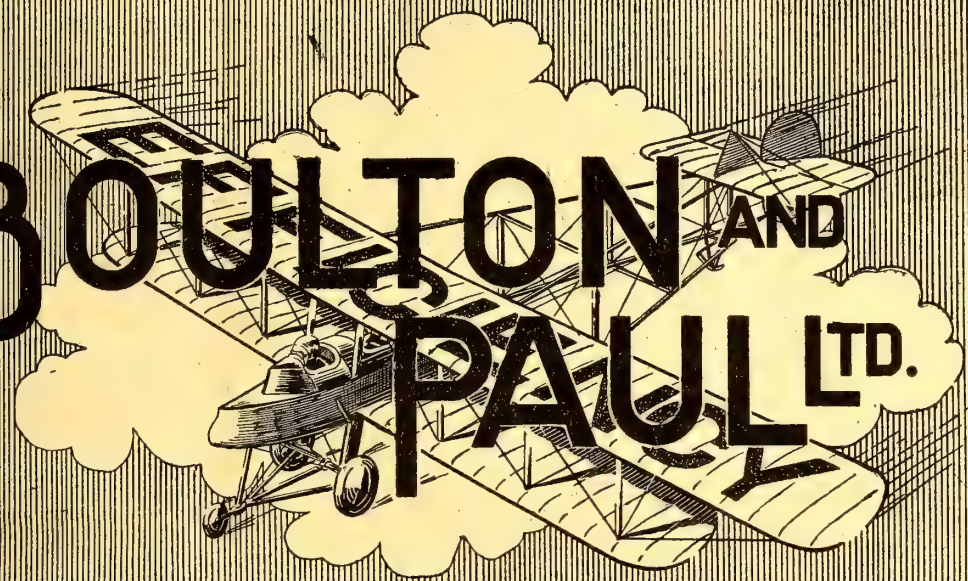


Fig. 2.—A space about 1/30 inch wide, magnified, showing a network of ferric-carbide, which becomes broken up by vibration. In hard steels this network sometimes oxidyses or rusts internally.

These matters concern the present subject, because vibration may cause the loss of cohesive strength and supplant the less desirable adhesive one for it. It is possible for the particles of a metal which are at first practically intact, and thoroughly complete, to suffer from shocks in such a way that they are separately reduced to a state in which they only adhere to one another. They would then be capable of easily falling apart, or snapping, after an amount of work which ought not to deleteriously affect them.

Welding, when efficiently done, gives rise to wholly cohesive properties; but if it is of an inferior nature the opposing surfaces are merely held together by a weak matrix, after the manner of

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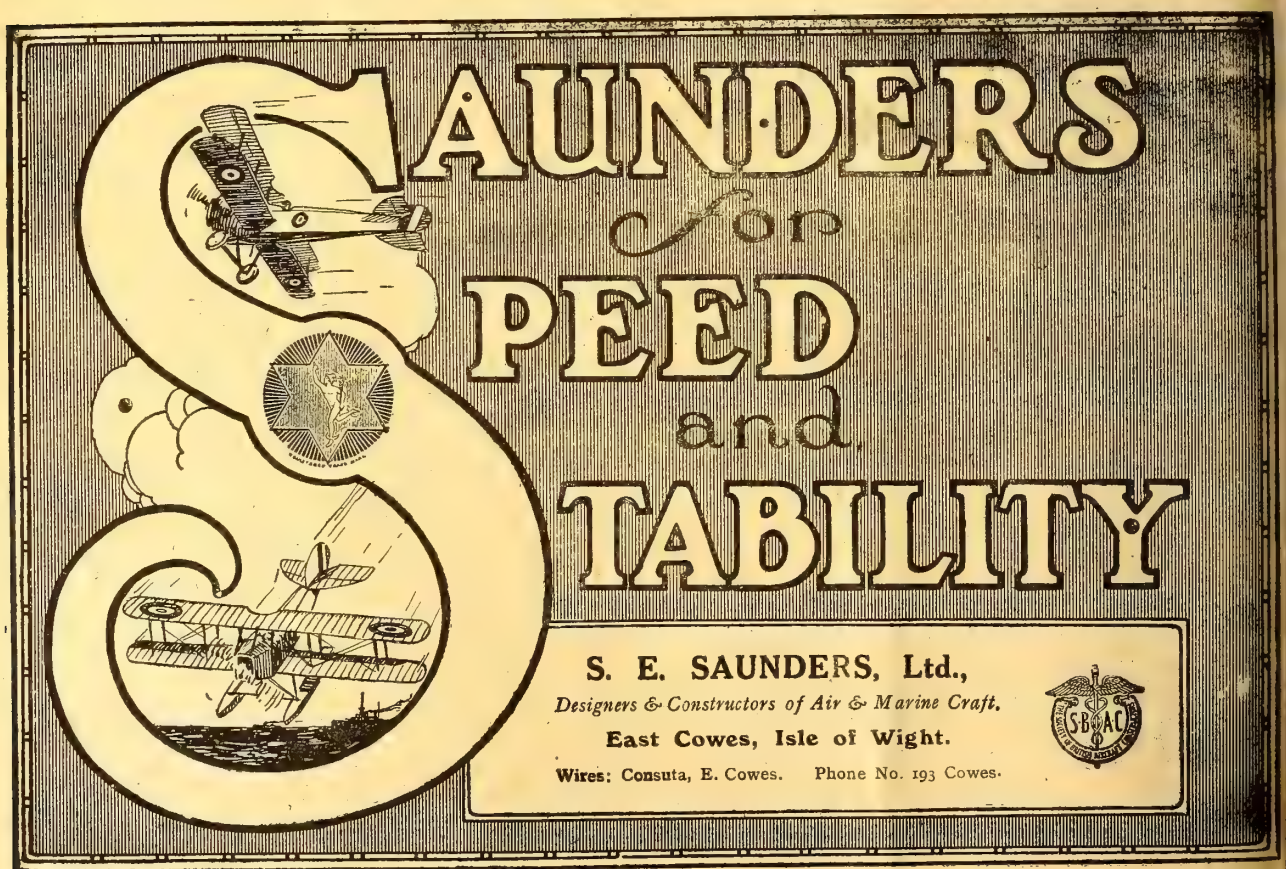
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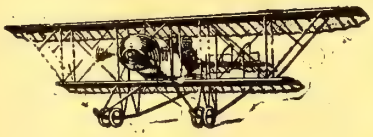
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Taper Pins—

Mountford, Fredk. (Birmingham), Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262.

Tapes and Smallwares—

MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.
James North Hardy & Son, Ltd., 54, Portland Street, Manchester. "Hardson, Manchester." Central 6471.

Timber—

Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Entikosil, Vic, London." Victoria 5073, 4210.
Brown, R. F., & F. W., Wollaton Saw Mills, near Nottingham. "Brown's Saw Mills, Wollaton." Nottingham 1526.
J. Owen & Sons, Ltd., 199a, Borough High Street, S.E.1. "Bucheron, London." Hop 3811 (2 lines).

Time Recorders—

Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310.

Turnbuckles—

Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

Tyres and Wheels—

The Beldam Tyre Co., Ltd., Brentford, Middlesex. "Beldam Tyres, Brentford." Ealing 125-126.
The Palmer Tyre, Ltd., Shaftesbury Avenue. "Tyricord, Weskent." Gerrard 1214 (4 lines).

Varnishes—

Clark, R. Ingham, & Co., Caxton House, S.W.1. "Pearline, Vic, London." Victoria 2923.
Harland, W., & Son, Merton, London, S.W.19. "Harland, Wimbledon 45." Wimbledon 45 and 1395.
Naylor Bros., Ltd., Southall, Middlesex. "Naylor, Southall." Southall 30.

Washers—

Herbert Terry & Sons, Ltd. Redditch. "Springs, Redditch." Redditch 61.

Watchmakers and Jewellers (Silver Models)—

Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 9091 (3 lines).

Welding Repairs—

Barimar, Ltd., 10, Poland Street, W.1. "Brilquamar, Reg, London." Gerrard 8173.

Wind Shields—

Auster, Ltd., 133, Long Acre, W.C. "Winflector, London." Regent 5910.
London Label Co., Ltd., Hadley Works, Beckton Road, E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.
Triplex Safety Glass Co., Ltd., Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Wires and Cables (Aeroplanes)—

Bruntons, Musselburgh, Scotland. "Wiremill, Musselburgh." Musselburgh 28.
Cradock, Geo., & Co., Ltd., Wakefield. "Cradock, Wakefield." Wakefield 466 (3 lines).

Wirework—

Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Woodworking Machinery—

Robinson, Thomas, & Son, Ltd., Railway Works, Rochdale. "Robinson, Rochdale." Rochdale 467.
Sagar, J., & Co., Ltd., Halifax. "Sawtooth, Halifax." Halifax 136.
Wadkin & Co., Leicester. "Woodworker, Leicester." Leicester 3614.

THE AEROPLAN

Acetylene Welding Plant—
Imperial Light, Ltd., 123, Victoria St., S.W. "Edibras, Phone, London." Victoria 3540.

Aeroplane Manufacturers—
Aircraft Manufacturing Co., Ltd., Hendon. "Airmanship, Hyde, London." Kingsbury 180.

Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne." Gosforth 500.

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.

British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol." Bristol 3006.

British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudroplan, Crickle, London." Hampstead 5551.

Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6. Hampstead 4728.

Davidson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1144-1145

Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1176.

Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. " Volplane, Hyde, London." Kingsbury 120.

Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrephid, Crickle, London." Hampstead 7420.

Mann, Egerton & Co., Aircraft Works, Norwich. " Motors, Norwich." Norwich 482 (4 lines).

Martinsyde, Ltd., Brooklands, Byfleet. " Martinsyde, Weybridge." Woking 331; Byfleet 171.

National Aircraft Co., Ltd., 15, Hackney Road, N.E.2. London Wall 6725.

" Nieuport " & General Aircraft Co., Cricklewood, London, N.W.2. " Nieuscout, Crickle, London." Willesden 2455.

Norman-Thompson Flight Co., Ltd., Bognor. " Soaring, Bognor." Bognor 48.

The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis, London." Putney 2240-2241.

Roe, A. V., & Co., Ltd., Manchester. " Triplane, Manchester." City 8530-8531, Manchester.

Sage, Frederick & Co., Ltd., Walton, Peterborough. " Sage, Peterborough." Peterborough 128.

Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes." Cowes 193.

Short Bros., Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London." Regent 378.

Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston " Kingston 744.

Standard Aircraft Manufacturing Co., Effingham House, Arundel Street, W.C.2. "Gunsignrush, Estrand, London." City 86.

Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickerlyte, Knights, London." Kensington 6810.

Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000.

Westland Aircraft Works, Yeovil. "Aircraft, Yeovil " Yeovil 129.

White, J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes." Cowes 3.

Airships—
Airships, Ltd., High Street, Merton. Wimbledon 1314.

Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. " Tested, 'Phone, London." Regent 378.

Aluminium Castings—
Coan, R. W., 219, Goswell Road, London, E.C.1 "Krankases, Isling, London." City 3846.

Aluminium Presswork (Stampings, Etc.)—
Willans & Robinson, Ltd., Victoria Works, Rugby. " Willans, Rugby." Rugby 112 (3 lines).

Bearings (Etonia Cast Phosphor Bronze)—
Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. " Yes, Leeds." Central 3927.

Brass Sheets for Tipping Propellers—
Lucraft, H., & Co., 47, Fenchurch Street, London, E.C.3. " Lucraftia, London." Avenue 2217.

Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 995, 996, and 7006.

Buildings—
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.

Fairby Construction Co., Ltd., 117, Victoria Street, S.W.1. "Bizbield, London." Victoria 8868.

Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313

Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

The Wolfley Co., Ltd., Salisbury House, London Wall, E.C.2. "Wrathless, Phone, London." City 2681-2

Cable Coverings and Cable Controls—
Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Capstan Work—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223

Carburettors—
Hobson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.

Castings—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Lucraft, H., & Co., 147, Fenchurch Street, London, E.C.3. " Lucraftia, London." Avenue 2217.

Castings (Aluminium, Brass, Bronze, Machined or Rough)—
Coan, R. W., 219, Goswell Road, London, E.C.1. "Krankases, Isling, London." City 3846.

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Willans & Robinson, Ltd., Victoria Works, Rugby. " Willans, Rugby." Rugby 112 (3 lines).

Cellon—
Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawb, London." London Wall 5359-3622.

Celluloid (Non-Flam.)—
Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7.

London Label Co., Beckton Road, E.16. "Lonlabel, Canning, London." East 1300.

Clothing—
Burberry's, Ltd., Haymarket, S.W.1. Regent 2165.

Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6.

Hazel & Co., 4, Princes Street, Hanover Square, W.1. Mayfair 4071-2.

Robinson & Cleaver, Ltd., Regent Street, London, W.1. Gerrard 1070.

Component Parts—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (4 lines).

B. D. V. Aircraft Spares, Syon Chambers, 161, Kew Road, Richmond, Surrey. "Aeros, Richmond." Richmond 1681.

Central Aircraft Co., Palmerston Works, High Rd., Kilburn, N.W.6. Hampstead 4728.

The Aircraft Construction Co., Hartley Works, Beckton Road, E.16. "Aercreons, Canning, London." East 1300.

The Osborne Aircraft Co., Ltd., Whin Hill, Greenock, Scotland. "Cordage, Greenock." Greenock 618.

Cords, Tapes, and Threads—
MacLennan, J., & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.

Dopes—
British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312.

British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellutate, London." Regent 4046.

Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawb, London." London Wall 5359-3622.

Clark, Robert, Ingham & Co., Ltd., Caxton House, S.W.1. "Pearline, Vic, London." Victoria 2923.

Electrical Accessories—
Mann, Egerton & Co., Ltd., 357, Cleveland Street, London, W.1. "Installing, Euston road, London." Museum 70.

Premier Electric Heaters, Ltd., 258, 259, and 260, Bradford Street, Birmingham. "Fahrenheit, Birmingham." Midland 981.

Electric Cables—
E. Kalker & Co., Coventry. "Kalker, Coventry." Coventry 248.

Electric Lighting and Power—
E. Stanley Fardon, A.M.I.E.E., 67, Mosley Street, Manchester.

Engines and Parts—
Allen, W. H., Son & Co., Ltd., Engineering Works, Bedford. "Allen, Bedford." Bedford 85.

Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.

The Beauty School of Flying, Ltd., Chadderway, Cricklewood, N.W.2. Hampstead 1313.

Beardmore Aero Eng., Ltd., 113, Great Portland Street, W.1. "Beadmore, London." Museum 79.

Dudbridge Iron Works, Ltd., Stroud. "Victoria Street, London S.W.1." Victoria 8868.

Gordon Watney & Co., Ltd., Watney Combe, Reid, Ltd., Brewery, Pimlico, S.W.1. "Mercédès, Weybridge." Victoria 8868.

Green Engine Co., Ltd., Tividale, Staffs. Tipton 329.

Gwynnes, Ltd., Hammersmith Iron Works, Hammersmith, W. "Gwynne, Hammersmith." Hammersmith 1600.

Rolls-Royce, Ltd., 14 and 15, Conduit Street, London, W.1. "Rolhead, London." Gerrard 374.

The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.

Sturtevant, B. F., Co., Ltd., Hyde Park, London, U.S.A.

Sunbeam Motor Car Co., Ltd., Wolverhampton. "Moorfield, Wolverhampton." Wolverhampton 1070.

The Gnôme & Le Rhône Engine Co., 47, Victoria Street, S.W. "Gnôme, London." Walthamstow 958.

Willans & Robinson, Ltd., Victoria Works, Rugby. "Willans, Rugby." Rugby 112 (3 lines).

Flexible Shafts—
Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch."

Flying Schools—
Bournemouth Aviation Co., Ltd., Talbot Village, Bournemouth. "Eirbes, Bournemouth." Bournemouth 616.

Cambridge School of Flying & Aviation Co., Ltd., 30b, St. Andrews Street, Cambridge.

Furniture (Office)—
Cooke's (Finsbury), Ltd., Finsbury Pavement House, London, E.C.2. London Wall 5359 and 5360.

Galvanising—
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.

Cowper-Coles Manufacturing Co., Serpentine, Thames.

Gears—
Moss Gear Co., Ltd., Thomas Street, Aston, Birmingham. "Mosgear, Birmingham." Aston Cross 840.

Glue—
Improved Liquid Glues Co., Ltd., Glue Village Street, E. (Croid). "Croid, Wapp, London." Mayfair 4071-2.

Membine Co., 8, Arthur Street, E.C. Bank 5

Goggles—
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Heating and Ventilating—
Comyn, Ching & Co., Ltd., Cecil House, Holborn Acre, W.C. "Comyn, London." Gerrard 1578.

Chas. P. Kinnell & Co., Ltd., 129, Southwark Street, London S.E. "Kinnell, London." Hop 3750.

Instruments—
British Wright Co., Ltd., 33, Chancery Lane, W.C.2. Holborn 1

Instruments (Scientific, meters, etc.)—
Short & Mason, Ltd., Maidenhead, Walthamstow, E.17. "Aeros, Walthamstow, London." Walthamstow 1

Machine Tools—
Brewster & Co., 11, Queen Victoria Street, E.C.4. "Circumfuse, Cannon, London." Central 1

Magneto Driving Pieces—
Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch."

Magnetos—
The M-L Magneto Syndicate, Ltd., Coventry Works, Coventry. "Corlins, Coventry." Coventry 1

The British Lighting & Ignition Co., Ltd., 204, Tottenham Court Road, W.1. "Lighting, Phone, London." Museum 70.

Metal Manufacturers—
Clifford, Chas., & Sons, Ltd., Birmingham. "Clifford, Birmingham."

Metals in General—
Samuel Mercer & Co., 101, Queen Victoria Street, E.C.4. "Reconciled, London." Central 1763.

Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 995, 996, and 7006.

BUYERS' GUIDE.

Metal Parts and Fittings—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Aircraft Supplies Co., Rand, London. "Upcast, Rand, London." Gerrard 276. W.C.2.

Arrott & Harrison, Ltd., Hythe Road, Willesden Junction. Willesden 2207.

Baynes, Jones & Bayliss, Ltd., Wolverhampton. (Bolts and Nuts.) "Bayliss, Wolverhampton." Wolverhampton 1042.

The Birmingham Guild, Ltd., 45, Gt. Charles Street, Birmingham. "Handicraft." Central 3705.

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

The British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow, London. "Golshel, Hounslow." Roundhay 345 (3 lines). Hounslow 254.

Brown Bros., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston road, London." Museum 70.

Mountford, Fredk., Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." Kings Norton 261.

Pratt, Owen, & Co., Ltd., Darlaston. "Roofs, Darlaston." Darlaston 87.

Sankey, Joseph, & Sons, Ltd., Wellington, Salop. "Sankey, Wellington, Salop." Wellington 66.

The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.

The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aercreons, Canning, London." East 1300.

Thomson Bros., Ltd., Bradley, Bilston. "Thomson Bros., Bilston." Bilston 10.

Wolter Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10.

Metal Shearing Tools—
Montgomery, Smith, & Co., Ltd., Tangent Works, Kevnsham, near Bristol. "Ingenuity, Salford." Keynsham 21.

Metal Spinnings—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Metric Bolts—
Clarke Bros., Zeta Works, Hildreth Street, Balham, S.W. Battersea 415.

Robert Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

Miscellaneous—
Anderson, D., & Son, Ltd. (Roofs), Belfast. "Anderson, Belfast " Belfast 4033-4034-4035.

Associate Glass Co., Ltd., 70, Turnmill Street, E.C. Central 3731.

Bowden Wire, Ltd., Willesden Junction, Bowerlim, Harles, London." Willesden 2400 (3 lines).

Brown Bros., Ltd., Great Eastern Street, E.C.1. "Inbrowned, Bethroad, London." London Wall 6300.

Buckfastleigh Manufacturing Co., Ltd., 61½, Fore Street, London, E.C.2. Labels in Metal, Ivory, Ivorine, etc.

Hedges Frood Co., Ltd., Chapel-en-le-Frith. "Frood, Chapel, Birmingham." Central 793.

Clayton Manufacturing Co., Ltd., 211, City Road, E.C. City 6558.

London Label Co., Ltd., Harley Works, Beckton Road, E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.

MacLennan, J., & Co., 30, Newgate Street, E.C.1, and at Glasgow. Tapes, Cords and Thread. City 3115.

Motor Cars—
Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.

Bayliss, Egerton & Co., Ltd., 329/381, Euston Road, London, N.W.1. "Manegecar, Euston, London." Museum 79.

Brasfield Motor Car Co., Coventry. "Flyscheel, Coventry." Coventry 530 (4 lines).

Nameplates and Labels—
Buckfastleigh Manufacturing Co., Ltd., 61½, Fore Street, London, E.C.2.

The Clegg Metal Engraving Co., Chatsworth Works, Worthing. "Clegg Worthing."

Observation Panels—
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Parachutes—
R. K. Calthrop's Aerial Patents, Ltd., Eldon Street House, Eldon Street, London, E.C. "Screenvalves, Ave, London." London Wall 3266-3267.

Patent Agents—
Boult, Patent Agency, 165, Queen Victoria Street, E.C.4. Central 682.

Bray & Rowlinson, 27, Chancery Lane, E.C.4. Central 332.

Stanley Popplewell & Co., 38, Chancery Lane, W.C. Central 1763.

Petrol Storage (Bulk)—
Clayton & Co. (The Hydraulic System), Clayton House, Kingsway, London, W.C.2. "Thesystem, London." Gerrard 2220.

Piston Rings—
British Chuck & Piston Ring Co., Coventry. "Rings, Coventry." Coventry 723.

Power Presses and Dies—
Bliss, E. W., & Co., 24, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon, London." Hop 4340.

Presswork—
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.

Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.

Integral Propeller Co., Ltd. "Avipror, Hyde, London." Hendon 9, Kingsbury 104.

Lang Propeller, Ltd., Weybridge. "Aerosticks, Weybridge." Weybridge 520-521.

Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich " Norwich 482 (4 lines).

Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 291, Leeds.

Sage, Frederick, & Co., Ltd., Walton, Peterborough. " Sage, Peterborough " Peterborough 128.

Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.

Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

Rigging for Aircraft—
Cradock, G., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466.

Safety Belts—
Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432.

Sage, Frederick, & Co., Ltd., Walton, Peterborough. " Sage, Peterborough." Peterborough 128.

Sand and Die Castings—
Coan, R. W., 219, Goswell Road, London, E.C. "Krankases, Isling, London." City 3846.

Scientific Instruments—
The Foster Instrument Co., Letchworth, Herts. "Instrument, Leeds." Chapeltown 474.

Seaplane Manufacturers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay, 345 (3 lines).

Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).

The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.

Sage, Frederick, & Co., Ltd., Walton, Peterborough. " Sage, Peterborough." Peterborough 128.

Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.

Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton." Southampton 1337.

Seats for Aeroplanes—
Bowser, E., Art Cane Works, 30 Park Lane, Leeds. Central 3437.

Shackles—
The British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow. "Golshel, Hounslow." Hounslow 254.

Sheet Metal Pressings—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.

W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk, Bham." Central 550.

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 497 Birmingham.

Nicholls & Lewis, Ltd., 16, Princep Street, Birmingham. "Colpressed, Birmingham." Central 2788.

Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

Sheet Metal Work—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.

Shock Absorbers (Elastic Cord)—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Sage, Frederick, & Co., Ltd., Walton, Peterborough. " Sage, Peterborough."

Sparking Plugs—
Peterborough 128.

Forward Motor Co., Sumner Row, Birmingham Central 6259.

Hobson Manufacturing Co., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.

Lodge Sparking Plug Co., Ltd., Rugby. "Igniter, Rugby." Rugby 235.

Ripault, Leo, & Co., Ltd. (Oleo Plugs), 642, Holland Street, W.1. "Ripault, Reg, London." Gerrard 7758.

Springs—
Dart Spring Co., West Bromwich. "Dart, West Bromwich." West Bromwich 322.

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Steel—
Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237.

Nicholls, Bernard, & Co., Birmingham. "Bernico, Birmingham." Smithwick 224.

Steel Tension Wires—
Cradock, G., & Co., Ltd., Wakefield. "Cradock, Wakefield." Wakefield 466 (3 lines).

Steel Tubes for Aeroplanes—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Taper Pins—
Mountford, Fredk. (Birmingham), Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262.

Tapes and Smallwares—
MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.

James North Hardy & Son, Ltd., 54, Portland Street, Manchester. "Hardson, Manchester." Central 6471.

Timber—
Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Entiboil, Vic, London." Victoria 5073, 4210.

Brown, R. F., & F. W., Wollaton Saw Mills, near Nottingham. "Brown's Saw Mills, Wollaton." Nottingham 1526.

J. Owen & Sons, Ltd., 199a, Borough High Street, S.E.1. "Bucheron, London." Hop 3811 (2 lines).

Time Recorders—
Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310.

Turnbuckles—
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

Tyres and Wheels—
The Beldam Tyre Co., Ltd., Brentford, Middlesex. "Beldam Tyres, Brentford." Ealing 125-126.

The Palmer Tyre, Ltd., Shaftesbury Avenue. "Tyricord, Wesdesk." Gerrard 1214 (4 lines).

Varnishes—
Clark, R. Ingham, & Co., Caxton House, S.W.1. "Pearline, Vic, London." Victoria 2923.

Harland, W., & Son, Merton, London, S.W.19. "Harland, Wimbledon 45." Wimbledon 45 and 1395.

Naylor Bros., Ltd., Southall, Middlesex. "Naylor, Southall." Southall 30.

Washers—
Herbert Terry & Sons, Ltd. Redditch. "Springs, Redditch." Redditch 61.

Watchmakers and Jewellers (Silver Models)—
Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 9091 (3 lines).

Welding Repairs—
Barimar, Ltd., 10, Poland Street, W.1. "Brequanar, Reg, London." Gerrard 8173.

Wind Shields—
Auster, Ltd., 133, Long Acre, W.C. "Windscreator, London." Regent 5910.

London Label Co., Ltd., Hadley Works, Beckton Road, E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.

Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Wires and Cables (Aeroplanes)—
Bruntons, Musselburgh, Scotland. "Wiremill, Musselburgh." Musselburgh 28.

Cradock, Geo., & Co., Ltd., Wakefield. "Cradock, Wakefield " Wakefield 466 (3 lines).

Wirework—
Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Woodworking Machinery—
Robinson, Thomas, & Son, Ltd., Railway Works, Rochdale. "Robinson, Rochdale." Rochdale 467.

Sagar, J., & Co., Ltd., Halifax. "Sawtooth, Halifax." Halifax 136.

Wadkin & Co., Leicester. "Woodworker, Leicester." Leicester 3614.

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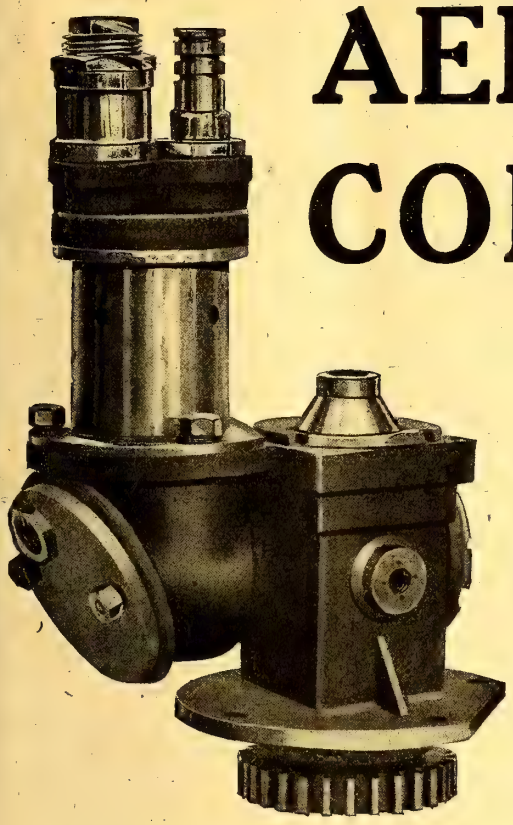
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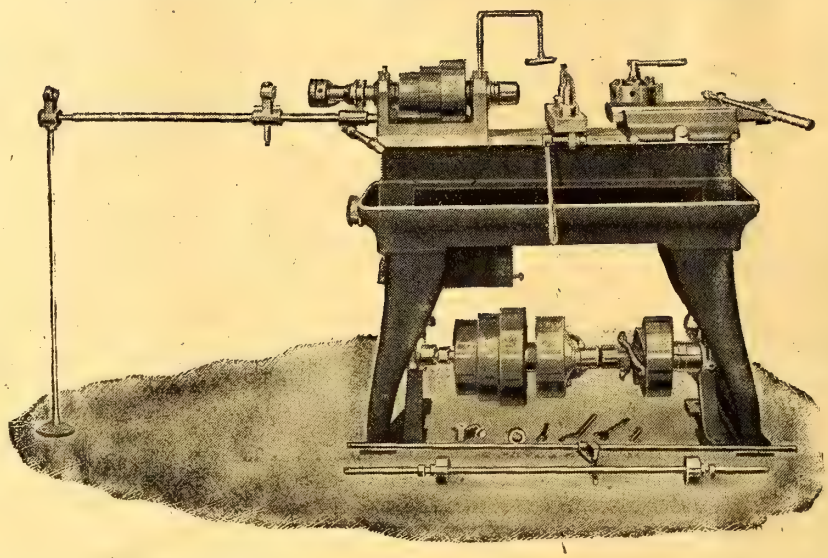
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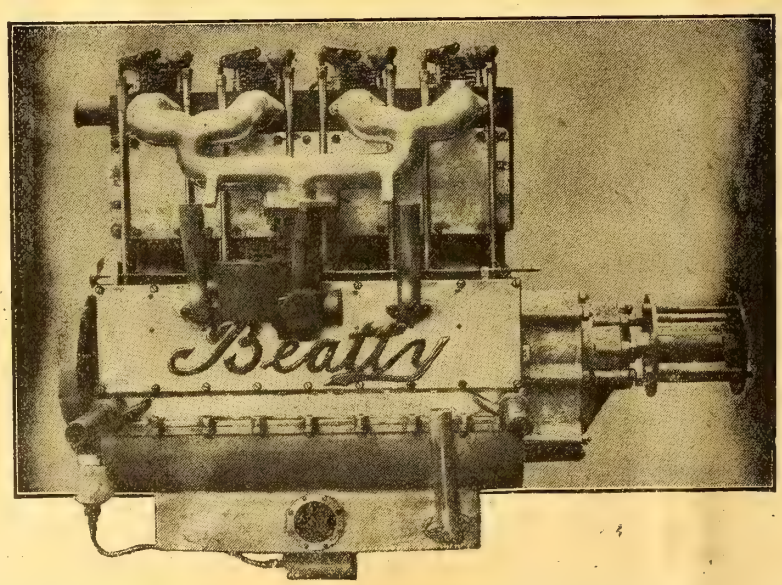
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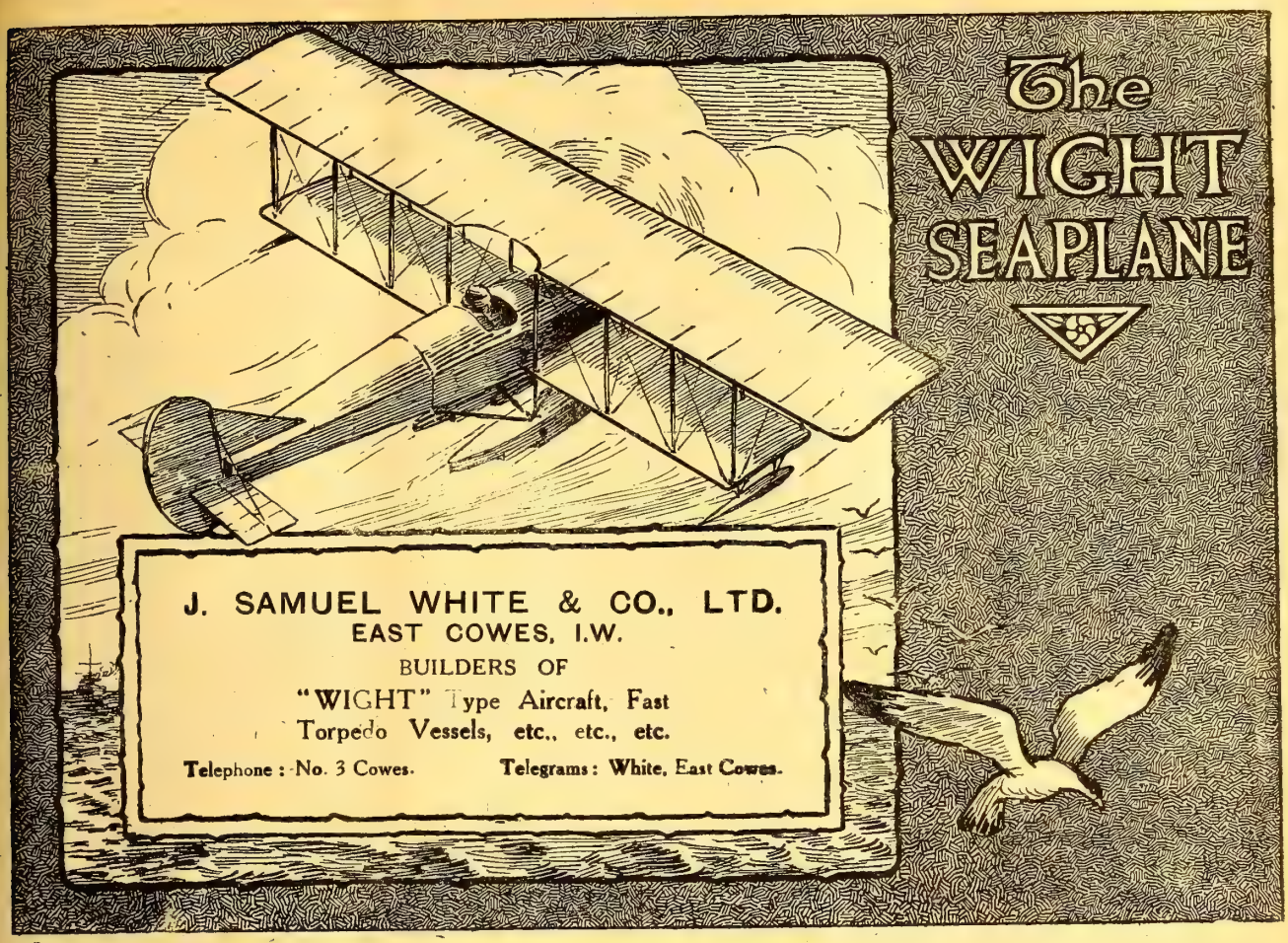
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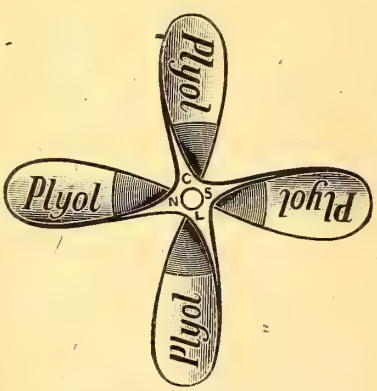
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glue on wood, and thereby consists really of adhesively joined portions.

Metals possess a small amount of elasticity, which enables them to recover their normal conditions after strains if these are kept within limits. Suppose that we rapidly shake a sheet of metal while it is held upright by one corner or end. It is then vibrated into a successive series of waves or bends which must temporarily modify some of the particles; but when the metal is allowed to rest it is found to be as perfect as before, sectional and chemical investigations failing to disclose any striking changes. But, in the event of the action being sufficiently severe, a part is twisted so much that it retains the malformed shape, the particles concerned in the affected area being consequently entirely altered, and these will not resume their previous cohesive properties. This fact can be well demonstrated and observed in a piece of sheet tin, the crystals of which become very bold and loose along the convex lines of a curve or distortion. The oftener such treatment occurs, the worse it becomes.

Constant vibration gradually produces comparatively coarse crystals, which may meantime split parallel with their geometrical planes or sides, or along the positions conforming to them. The minuter ones combine, as it were, into larger kinds, but as there is no corresponding homogeneity they become individually flaky, with increase of dimensions, so that the binding power is reduced.

Some particles of a softer composition than others may congregate together into what are called flow-lines. Soft particles may also get scattered in a network of harder consistency, the one helping the other. The hard one is kept from snapping by the presence among it of the soft constituent; while the latter cannot fall out as it is held inside the hard cellular mass. In this case the contents are so well balanced that vibration shakes the hard particles together into a skeleton network or framework, which is prevented from becoming too brittle because of intervening pad-like soft contents. But *excess* vibration splits up the network and spoils it.

Metals behave differently in regard to vibration according to their form. Flat, wide metals do not respond in the same way as is noticeable in connection with bulky varieties.

In many cases, during vibration, particles slide or roll over one another, without the external formation of the whole mass being visibly altered. At the same time, the very slight modifications induced *have* been measured by means of delicate instruments. The pressure of the atmosphere, and so on, on all surfaces of the metal makes these actions resemble the movements of sand grains tightly packed in a box which is repeatedly turned about on itself or knocked. This is, of course, only a likeness, since these grains are loose, but my meaning will be clear, I hope, The cohesive force of a solid metal does not permit so easy a shifting of the particles, but alterations in position do happen, especially when strains are increased or continued incessantly. The particles go round and between one another, but do not leave the mass.

These changes eventually impart a striped structure to the metal, in the direction of its length. The tinier particles fall into grooves occasioned between the larger ones, and there is thus set up an alternating series of proportionately thin and thick areas, known as slip bands, which appear as dark and light lines when they are magnified.

A weakened condition of a metal may appear after too rapid cooling from the molten form, and not reveal itself until continued vibration has been experienced. In this way unstable phases which would be harmless and unalterable if the metal was employed for strictly suitable purposes become more and more paramount until breakage occurs. Chilling is adopted to prevent this modification. It gives a solid skin to the substance and permits the internal portions to cool at a slower and fairly uniform rate. Very tiny crystals, the collective strength of which

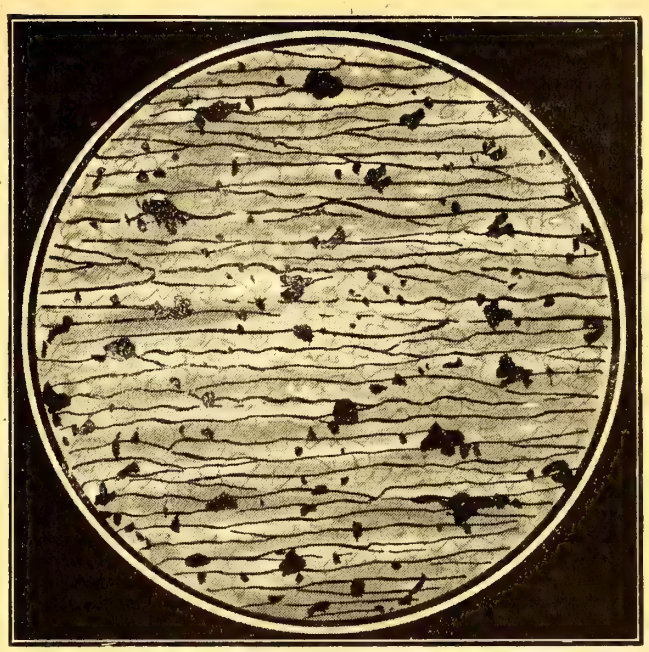


Fig. 3.—A space about 1/30 inch wide, magnified, showing slip-bands, due to vibration, in wrought iron and kindred metals.

is admirable, are resolved. But the process must not be overdone, or it may set up other faults. Proper annealing, too, nullifies any tendency in a wrong direction by fusing the little crystals compactly together.

Wrought iron is fibrous, although the particles are originally granular. The hammering to which the metal is subjected may be compared with vibration of so fierce a kind that the particles do not have time to recover their shapes. Now, it is a curious fact that wrought iron becomes granular again during true subsequent mechanical vibration, but it can be again resolved into the fibrous state by treatment.

It seems that the granular and fibrous textures of metals and alloys can succeed one another continuously in many instances, but not in all. Particles may unite end to end, forming striped layers, and these may, or may not, be capable of becoming resolved into the granular state. When a limit is reached in certain metals, cohesive power is lost, some of the particles fall asunder, and then a little unusual strain results in completely dividing them, and an irremediable fracture follows. Some metals and alloys reveal these formations when cut into sections without preparation; whereas others need to be etched with some suitable chemical re-agent.

The aim of the metal manufacturer is to provide reliable substances suitable for specific purposes, but defects unfortunately arise while shaping into various objects is being undertaken. But the most excellent article may be spoilt by agencies, including atmospherical fumes, which are quite beyond our control; and vibration then discloses damage which would otherwise have remained unseen.

In No. 1 the grains have been shaken into ridges, parallel with one another, thereby weakening the metal. In No. 2 the network (first helping to strengthen it) has become snapped and inferior. In No. 3 consolidated stripes have settled into dense bands capable of fracturing smaller, and ruining the metal.

A PLEA FOR PATIENCE.

Owing to the great public interest taken in the new geared electric starter for motors, just introduced by Messrs. C. A. Vandervell and Co., recently announced in The Aeroplane, the firm have found it impossible to cope with all the demands for booklets, drawings, etc., but inquiries are being dealt with as rapidly as possible.

KEEP THE HOME CARS TURNING.

The intense activity everywhere displayed in the Naval, Military, and Aircraft Departments of the British Service just now is reflected in no uncertain fashion by the urgent requests pressed upon Barimar, Ltd. In every branch of public service the skill of Barimar specialists in recreating fractured parts and defective radiators has attracted great attention, and the London firm is entitled to take credit to itself for the splendid manner in which it has organised all its departments

Major A. Cameron, of the General Staff, bears witness to Barimar's work in the following words:—"I have received the radiator. I may say at once that I am most appreciative of the efforts that have been made in order to effect the repair of this part expeditiously. The work appears to have been carried out in an eminently satisfactory manner, and I am bringing this to the notice of the authorities with whom I am in contact." Both public officials and private individuals whose cars are temporarily brought to a standstill cannot do better than call on these well-known specialists at 10, Poland Street, London, W.1.

ALEXANDERS' GREAT PLANS.

At London Sessions, on Oct. 10th, before Sir Robert Wallace, K.C., a Greek clerk, named Facdo Cokinaki, aged 28, was indicted for stealing plans for the construction of aeroplanes and hangars and certain letters, belonging to William James Henry Gordon Browne and another, trading as Alexander and Co.

Mr. Browne said that the plans were worth about £200 and were his personal property. On missing them he communicated with the police, and a parcel containing the plans was found in the cloak-room at the Piccadilly Tube Station.

In cross-examination by Sir Archibald Bodkin, who defended, Mr. Browne said that the defendant told him that he would return the papers if he got the sum of £27 10s., which the prosecutor's partner owed him.

On the Judge's suggestion, the jury returned a verdict of "Not Guilty," and the defendant was discharged.

AIRCRAFT PRODUCTION.

Nearly 12 months ago, Colonel G. O. Squier, of the U.S.A. Signal Corps, gave, when he addressed the National Academy of Science at Boston, Mass., a summary of aeronautical problems requiring investigation. The protective coating of aeroplane metal parts was one item among many of supreme importance.

The usual practice of painting or enamelling strut ferrules, rib sockets, clips, etc., is, at the best, only a compromise. The safety factor of any one metal part only remains as designed when the piece is sound; the reduction of the metal by rust (the most usual corrosion), either over the whole or in part, immediately lowers the safety factor value, and consequently the life of the machine, also possibly that of the pilot

A conception of quick deterioration is more impressive when it is known that the reduction in diameter by only 0.001 of a rod having a breaking point of 40 tons lowers the breakdown limit by more than 1 cwt. It does not take long for rust to attain a thickness of 0.005 in., and often that hundred-weight is wanted.

To be a protection, the coating on the metal part must be thoroughly amalgamated with the surface, or skin, on the piece it is desired to safeguard. The slightest mechanical injury to paint reveals its weak tenacity. Again, it is rare, even in the best work, to find a paint that is not porous and does not blister. Stove enamel is little better, owing to its brittleness, and with the grades of steel now being used, even comparatively low temperatures have an uncanny way of lowering stress values.

The foregoing facts caused the writer to gather data regarding the protective coating of ferrous metals from hot galvanizing to oiling. Any process involving treatment by heat (and they are the majority) was at once placed on one side. The methods remaining comprise the whole gamut of electro-plating.

The commonly-used metals, such as copper, nickel, etc., do not afford sound protection for any period unless specially manipulated; also their galvanic relation to ferrous articles in the presence of atmospheric moisture causes a more rapid transformation of the iron into rust than would be the case if the iron were not "protected" by them.

The only sound proposition in this category is that of galvanizing by the electro-deposition of zinc. As a metal, zinc is electro-positive to iron or steel, and this is the main reason galvanizing in any form is the most commonly used protection against rust. Hot galvanizing has been rejected on account of the heat necessary, and the only practical other method is cold galvanizing, or electro-galvanizing, both titles of importance.

By this process a strong adherent film of zinc is deposited on the strut ferrule, or what not, in such a manner that the configuration is unblemished, a result unattainable by any other process of galvanizing. The charm of this is apparent when accurately-machined parts are considered.

It is essential that all dirt, grease, oxide, etc., be removed from the article before it can be plated with zinc; this necessity proves the close affinity of the deposit with the iron. A dirty patch does not become coated, and is apparent to the eye. Very few processes have this ability, the piece generally appearing to be protected and failing at some point after being in use for a short period; such can rarely happen to electro-galvanized work owing to the immediate visibility of any imperfection preventing the use of badly-executed work.

Mention may be made here of the practice of electro-galvanizing high-pressure, solid-drawn, steel tubing. To the trained eye, a tube that has a faulty structure is easily discernible when electro galvanized, but in the original bright state it would be practically impossible to detect the flaw.

Since the vitality of an aeroplane is dependent on many ingeniously light metal parts, the desirability of these receiving protection against corrosion is one of paramount importance.

The same process is also applicable to various parts, such as gun-mountings, synchronous firing gears, bomb release gears, etc., etc., and would save many a jam.

Woodcraft enjoys a protective coating of varnish, but the scientific rust-proofing of the metal principals seems to have been overlooked by the powers that be.—J. CLANE.

A SUCCESSFUL SCHOOL PILOT.

The part played by the instructor at a flying school is not without its responsibilities. In the first place, he has to deal with all sorts of human material, from the man who was born a pilot to the man who is congenitally unfitted to fly, and setting aside immediate responsibility for the bodily safety of his charges, he knows that on his tuition rests to a considerable degree the success or failure of the pupil of the future.

Among those who have done well in this work is Mr. Edgar Brynildsen, a Norwegian subject who has been associated with British aviation since 1912, when he worked at gliding with M. José Weiss, at Amberley.

Since then Mr. Brynildsen has adopted the teaching of flying as a profession, and both at Hendon and at the Bournemouth Flying School has done some very good work, most of his pupils having passed into the Flying Services.



Mr. Edgar Brynildsen.

Although Mr. Brynildsen's career of instruction has been remarkably free from accident, both as regards himself and his pupils, various humorous incidents have occurred from time to time, such as are met with at all flying schools. One story which he tells is really too good to miss, and it is best told in his own words:—

"A few weeks back a pupil was taking his 'ticket.' He got up to about 3,000 ft., lost sight of the aerodrome, and began taking a straight course right away from same, and was getting out of sight. I then got out a more powerful machine (80 Caudron), and set off after him. After flying about seven miles I caught him up as he was landing in a field. I started spiralling down, and landed in the same field. I found him with machine somewhat damaged through bad landing, and with crowds of people gathering round him, all in the belief that it was a Hun machine which I had brought down, having heard my engine backfire and believing the explosions to be machine-gun firing."

In addition to his regular school duties, Mr. Brynildsen is prepared to undertake the testing of standard machines or experimental flying. He is certainly to be recommended as a safe and steady pilot.

THE PATENTS INDEX.

The subjoined list of recent inventions has been specially compiled by THE AEROPLANE from the current Official Patents Records.

PATENT APPLICATIONS.

Blackburn Aeroplane and Motor Co. Deck flying wheels, trucks, or trollies, for aeroplanes, etc. No. 14793. Oct. 12th.

Blackburn Aeroplane and Motor Co. Aircraft. No. 14864. Oct. 13th.

Carson, J. H. Manœuvring apparatus of aeroplanes. No. 14790. Oct. 12th.

Clark, W. G. Covering material for aircraft. No. 14544. Oct. 8th.

Harris, W. P. Propellers, etc., for aircraft. No. 14506. Oct. 8th.

Hawksley, A. F. Wheels for aeroplanes. No. 14640. Oct. 10th.

Killen, E. B. Means for destroying aircraft. No. 14789. Oct. 12th.

Killen, J. K. Safety device for flying-machines. No. 14508. Oct. 8th.

Lumb, C. F. Means or motors for driving propellers of aircraft. No. 14669. Oct. 10th.

Mees, A. B. Propellers for aircraft. No 14506. Oct. 8th.

Molins, W. E. Machine for winding aeroplane turnbuckles, etc. No. 14548. Oct. 8th.

Nalder, A. F. Method of setting optical finding or sighting apparatus, and means of application to aircraft. No. 14747. Oct. 11th.

Parnacott, A. E. Means for lowering captive balloons or airships. No. 14668. Oct. 10th.

Robinson, T. Attack upon aircraft by gunfire. No. 14639. Oct. 10th.

Sykes, W. Hydroplanes, etc. No. 14553. Oct. 8th.

Tarranr, W. G. Aeroplanes. No. 14610. Oct. 9th.

Yorke, W. Means for indicating balance of aircraft, etc. No. 14514. Oct. 8th.

COMPLETE SPECIFICATIONS ACCEPTED, PRINTS OF WHICH CAN BE OBTAINED ON AND AFTER NOVEMBER 1ST, 1917.

109,991. Sept. 27th, 1916. Connor, T. J. Landing chassis of flying-machines.

101,639. Sept. 30th, 1915. Redini, G. Carburettor, more particularly for use with aviation engines.

110,030. Oct. 10th, 1916. Patent Corporation, and Thompson, W. P. Flying-machines.

ABRIDGMENTS OF RECENTLY PUBLISHED SPECIFICATIONS.

108,664. Internal-combustion engines, gas turbines, etc. BOERNER, A., 37, Zeekant, Scheveningen, Holland.

In order to maintain constant power in engines for airships, etc., the carburettor or carburettors are supplied with air from a compressed-air reservoir, means being provided in the air-supply passage for governing the pressure at which the air is supplied. Preferably the governing-means consists of an adjustably-loaded reducing-valve, and the air reservoir may be provided with an adjustably-loaded safety-valve or a number of differently-loaded safety-valves, any of which may be locked.

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AERO-ENGINE APPRENTICES.

The scheme for the free training of apprentices to the aero-engine industry, which was formulated by the management of the Gnôme and Le Rhône Engine Co., for adoption at their works at Blackhorse Lane, Walthamstow, is now in working order.

The manager of the works, Mr. A. W. Towse, has now been able to arrange for every boy employed to become an indentured apprentice, and he has been able to arrange with the authorities concerned with higher education in Walthamstow to hold special evening classes for these boys. Boys working on the night shift are allowed to start at 10 p.m. in order to make it possible to attend these classes. Special demonstration lectures will also be arranged.

One great difficulty which had to be met was the very poor general education possessed by the majority of the boys, which made it impossible for them to pass the entrance examinations for the ordinary technical classes. For this reason the special classes arranged will deal the first year with reading, writing and arithmetic, made interesting by the introduction of engineering terms, quotations, and elementary mathematical work relating to engineering.

The operation of this system of training and apprenticeship will be watched with the greatest interest.

Those who wish their sons to enter the aircraft industry under conditions which will enable them to get on in the world are strongly recommended to apply for a free copy of a booklet entitled "On Apprentices," which is issued by the Gnôme and Le Rhône Engine Co., Blackhorse Lane, Walthamstow, E.17. Two stamps should be enclosed to cover postage.

A CRADOCK EXTENSION.

The well-known Wakefield firm of George Cradock & Co., Ltd., steel wire rope manufacturers, are now represented in the United States by Samuel Swett, of New York.

George Cradock & Co. have had over sixty years' experience in the manufacture of steel wire ropes, and in view of their special experience in the manufacture of steel cable for aeroplanes from the very early days possess very special knowledge of everything connected with the manufacture of steel strands, cables and tension wires for all kinds of aircraft

RAW MATERIAL.

Mr. L. A. Legros, the outgoing President of the Automobile Engineers' Institution, speaking at the Royal Society of Arts, on October 10th, said that the number of inspectors of aeroplanes had grown from a few hundreds four years ago to several thousands. They had been recruited from every class and trade—people who had been engaged in all sorts of odd and quaint employment.

He heard of an aeroplane worker who used to make the dots on dominoes, and another who once put the nicks in penknife blades. He had no doubt that inspectors could be found who used to dot the " i's " on tombstones. Only war revealed these curious employments.

In the erection of aeroplanes the man who shone best and was most useful was the organ-builder. He stood head and shoulders above everyone else, and was followed by the pattern-maker; but in propeller work, where the pattern-maker might be expected to be first, the man who came out best was the chair-maker.

TIMBER MEASUREMENTS

Those who are only now beginning to take an interest in timber may be glad to know that there are twelve super, or square feet, to a cubic foot. The price of Walnut and Mahogany should, therefore, be multiplied by twelve to ascertain the price per cube foot.

On reference to the Current Prices List, issued in THE AEROPLANE, it will be observed that Ash and Spruce are "Starred," "Price includes selection and delivery." This implies that the wood is in planks.

AIRCRAFT TIMBER.

A Reuter message from New York on October 9th stated that Mr. Arthur F. Thane has now been appointed Purchasing Agent, for Great Britain on the Pacific Coast, of lumber for aeronautical supplies. Mr. Thane will also have charge of the shipping on the Pacific Coast in the interests of Great Britain.

[Mr. Thane's qualifications as a selector of aircraft timber are not familiar to the Aircraft Industry as a whole, but doubtless he has a knowledge of his subject.—Ed.]

Mr. R. B. Maxwell, assistant curator of the section of wood technology at the U.S. National Museum, has resigned in order to accept a position as chief inspector to the American Propeller and Manufacturing Co., of Baltimore, Md.

USEFUL WORKSHOP TABLES.

Copies of the Screw Thread Table, compiled by Mr. V. P. Benedict, and published recently in this paper, also copies of the Table of Limits and Allowances, and of Metric Conversions, may be obtained from this office, price 1s. the set. These are printed on cardboard suitable for framing or for sticking on the walls of workshops and offices.

FITS AND MISFITS.

The following letter has been received :—

Sir,—Re Fits, Misfits, and Limits, page 1029, Oct. 10th, 1917. Under above title and in subdivision "Limits," hole is given at maximum 1.0005 inch. Later, in dealing with the shaft, largest permissible hole is given as 1.00025 inch, and smallest diameter of shaft at 0.99925 inch, giving a clearance of 0.001, but surely this should read 1.0005—0.99925 equals clearance of 0.00125.

(Signed) N. PEMBERTON.

Mr. Benedict replies :—

Mr. Pemberton is right in his contention that the figure should have been 0.00125 inch instead of 0.001 inch. The error is an obvious one of simple addition and subtraction, but in quoting to illustrate the point figures were taken somewhat haphazard and were not intended to represent dimensions for actual application.—V. P. B.

AEROPLANE TAPES AND SMALLWARES.

In these days it is a very rare occurrence to find a firm which holds a large stock of any kind of material or articles of trade, but one is pleased to receive assurance from Messrs. John MacLennan and Co., of 30 and 31, Newgate Street, E.C.1, and Glasgow, that they are in this enviable and happy position, and can, therefore, give quick delivery of any of the articles which they advertise. This is a most important point in view of present circumstances, and should be carefully noted by all aircraft firms.

A REMINDER.

As recently noted in this paper, in the recently published Annual Report of the Advisory Committee for Aeronautics it was stated that the investigations on the subject of aeroplane radiators had been brought to a conclusion and recommendations made for standardisation.

Effect has now been given to these conclusions by the Air Board, and a confidential circular letter has been issued to aeroplane contractors and radiator makers, instructing them as to the material which is to be used for this purpose in future designs. Inquiries on the subject may be addressed to the Department of Aeronautical Supplies, Room 609, Air Board Office, Strand, W.C.2.

THE HIGHFLYER.

"The Highflyer," house journal of the Norman Thompson Flight Co., Ltd., Middleton, Bognor, has now reached the dignity of pukka printing, its editors finding its increasing circulation too much for the office duplicating machine. The price remains the same, namely, 6d., but in view of the excellent paper and printing, the general dignity of the "layout" and the really excellent literary matter, the price is not excessive.

The October issue contains a most interesting history of early naval vessels, named after the county of Sussex and its principal towns. "Airman Jock" is a cheery song set to the tune of "Longshoreman Billy," sung by a Celtic "pilot" against himself.

Those who wish to inspect the other absorbing features in "The Highflyer" should send seven stamps to the editor for a copy.

B.H. THIMBLES.

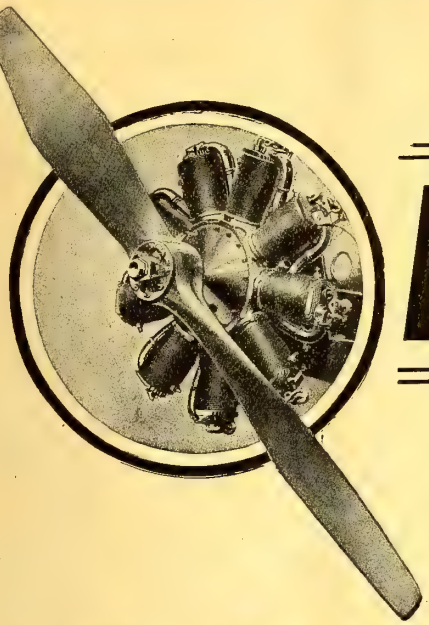
The aircraft constructor who experiences difficulty in obtaining adequate supplies of such harmless but necessary accessories as B.H. thimbles and wire ferrules is invited to communicate with Whiteman & Moss, Ltd., of 15, Bateman Street, W.1., and mention THE AEROPLANE. This firm holds a good stock of these parts, and immediate delivery can be given.

BURYING A RIVER.

The consignment of the Cardinal Wolsey River to its subterranean oubliette at Mr. J. A. Whitehead's combined estate and aerodrome at Handworth Park was performed on October 16th by the Lord Mayor, as advertised, despite the interference of the rain, which apparently feared that the disappearance of the river into a dug-out would affect its interest in the watershed as a going concern.

The " reinforced concrete inverted syphon," which can pass 27,000,000 gallons of water daily, worked excellently, and settled down to its task with the spirit usually associated with syphons.

Just before the river was diverted, fifty soldiers marched through the conduit, and it was well for them that the electric button which was arranged to set the machinery of diversion in operation was not touched prematurely, for in such an event they would probably not have found the result diverting. However, one is gratified to find that, despite the demand for men, soldiers are available for such amusing antics.



AERO ENGINES

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

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HOUNSLOW 254

THE AIRCRAFT TRADER

MARKET REPORTS.

Prices given are for quantities on usual terms.

October 18th, 1917.

COPPER.—The chief interest centres round conditions prevailing in U.S.A., production and distribution being the two main problems attracting attention. The former does not appear to improve. It was rumoured that the California dispute had been settled. If this is correct, the resumption has not been permanent, as the mines are again shut down. The various reports received do not indicate any possibility of an early settlement, and, in consequence, the question of supplies is still very acute. It is reported that the U.S. Government are considering a Central Pool Board for distribution of Copper and other materials required for work of national importance. Conditions here remain unaltered; official prices remaining the same. Strong Sheets are now £150.

Comparative Prices.

To-day	£110 per ton.
Last Month	120 per ton.
Last Year	122 per ton.
Average Price, 1916	116 per ton.

TIN.—The price of tin has now advanced to £247 10s., which is the highest price reached this month. The shortage of supplies cannot be held responsible for this advance, large supplies having recently been received. Buyers are evidently being influenced by the uncertainty of the shipping situation, and, in consequence, there has been a large demand for near deliveries.

Comparative Prices.

To-day (17th)	£247 10 0
October 12th	246 10 0
October 8th	245 0 0
Last Month	246 0 0
1916	179 10 0
Highest Price, 1916	205 0 0

LEAD.—Official prices remain unaltered. The output in Australia has been impeded, but it is reported that the situation is now much more satisfactory. It is, of course, impossible to obtain supplies here for anything but work of national importance.

STEEL.—The Steel output is increasing by leaps and bounds and, furthermore, the restrictions upon consumption for ordinary purposes are being tightened. This is certainly very essential as there still appears to be a large quantity of Steel being used for purposes where substitutes would do, and also for ordinary peace-time purposes. Although the restrictions will cause inconvenience in certain directions, in consideration of the vital importance and urgency of large supplies of Steel for aircraft and shipbuilding and other national needs, the stricter and more rigid control of consumption should be welcomed. There is, of course, the usual fear of manufacturers, who are engaged on frightfully urgent contracts, being delayed owing to the filling up of forms, obtaining permits, etc., etc.

The officials handling this side of the business are recommended to study the systems prevailing in other departments, with the object of inventing one which would eliminate this prevalent complaint. Needless to say, this would not be a difficult task.

The proposal that the U.S. Government should take steps to increase the shipments of Steel to this country does not appear to have had any definite result, although the U.S. firms apparently anticipate something being done, and have sent supplies here at a cheaper price.

Prices still remain unaltered, although the price of Cast Steel is stiffening; this was anticipated in the previous reports

TIMBER.—Up to the present unofficial statements only appear to have been received regarding Silver Spruce substitutes, although the information appears to be common property, at any rate, the demand for the woods has already commenced. There is every possibility of large supplies being available, and there is no occasion for panic. The shortage of other woods continues, Walnut and Mahogany being at a premium.

The Timber problem is, so far as the Aircraft Industry is concerned, one of the most serious, and it is gratifying to learn that the Air Board are seeking the assistance of experts of very wide and long experience. It is to be hoped that their advice is treated seriously.

It is generally agreed that the price of the Silver Spruce substitutes will be cheaper than the price at present ruling for Spruce. The price of the latter is still mounting upwards, English Ash also is keeping it company.

FABRIC.—It is very disappointing indeed to learn that the Irish labour troubles remain unsettled. The position is now becoming most serious; several factories are becoming alarmed at their low stocks.

CURRENT MARKET PRICES.

Oct. 4th, 1917.

The prices given below are the prices ruling on the above date.

TERMS.—Usual for the various materials mentioned.

Prices of old metals are as quoted by scrap dealers.

Prices must not be taken as specific quotations for definite quantities delivered to any part of the country.

ALUMINIUM.

Ingot	£225 per ton.*
Remelted	£210 per ton.*

BRASS.

Sheets	15⅝d. per lb.
Strip	14⅛d. per lb.
Wire	14½d. per lb.
Tubes	15¾d. per lb.
Castings	15d. per lb.
Turning Rod	14¼d. per lb.
Brazed Tubes	20d. per lb.

COPPER.

Ingot, Standard, Cash	£110 per ton.*
Ingot, Standard, 3 mos.	£110 per ton.*
Best Selected (Nett)	£123 to £119 per ton.*
Sheets	£150 per ton.
Wire	15½d. per lb.
Tubes, S.D.	18½d. per lb
Tubes, Brazed	18½d. per lb.
Rivets	1s. 11½d. per lb., basis.
Tacks	1s. 11d. per lb.

FABRIC.

Linen, R.A.F., 17C, Spec., 36 in. wide, 2s. 8d. p. yd.*	
Linen, R.A.F., 17C, Spec., 38 in. wide, 2s. 9½d. p. yd.*	
Spaced, R.A.F., 17C, Spec., 37½ in. wide, 1s. 9d. p. yd.*	

GUN METAL.

Castings	1s. 8d. per lb.

LEAD.

Virgin Pig	£29 per ton, c.i.f.*
Virgin Pig	£30 per ton, ex stores.
Sheets	£39 10s. per ton, D/D.
Pipes	£40 per ton.
Dry White	£46 10s. per ton. less 5 per cent.
White in Oil	£53 per ton. (lots over 5 cwt. less 5 per. cent.)
White in Oil	£55 per ton. (lots under 5 cwt. less 5 per cent.)
Red, in Oil	£42 per ton, less 2½ per cent.

NICKEL.

Nickel	£200 per ton.

PHOSPHOR BRONZE.

Ingots, 5 cwt., and under	£150 to £170 per ton. (Subject to Copper and Tin Fluctuations.)
Castings	1s. 7d. to 1s. 9d. per lb.

PHOSPHOR COPPER.

Ton lots	£200 to £205 per ton.

SILVER.

Silver	43¾ per oz.

SOLDER.

Plumber's	103s.
Tinman's	135s.

STEEL.

High Speed, 14 p. cent., Tungsten, 2s. 10d. per lb., basis.*†	
High Speed, 18 per cent., Tungsten, 3s. 10d. per lb., basis.	

ALLOY STEELS TO AIR BOARD SPECIFICATIONS.

Round and Square :—

Specification No. S2	£86
Specification No. S2 (bright-drawn)	£115
Specification No. S8	£86
Specification No. S10	£70
Specification No. S12	£75
Specification No. S14	£43
Specification No. S15	£70

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"Warings Factories, Hammersmith"

Specification No. S16	£70
Specification No. S17	£75
Specification No. S18 (oil-hardened)	£86
Specification No. K1	£75
Specification No. K2	£75
Specification No. K3	£86

The above prices are for ¼ in. to 5/16 in. only, other sizes are proportionate.

HEXAGONS.

	.455 and .525	.601 and .710
Specification S2	£79	£77
Specification S8	£79	£77
Specification S2 (bright-drawn),	£112	£112
Specification S8 (bright-drawn),	£112	£112

SPELTER.

English f.o.b., Birmingham	£57

TIN.

Tin	£246 10s.

TINPLATES.

Tinplate	30s., basis, f.o.t.*

TIMBER.†

	Official.	Merchants.
Silver Spruce,	10s. 4d.	17s. 9d., c.f.
English Ash		16s., c.f.
Mahogany,	1s. 6d. to 1s. 10d.	2s. 2d. to 2s. 6d., s.f.
Walnut,	2s. to 2s. 3d.	2s. 3d. to 2s. 6d., s.f.

ZINC.

Zinc Sheets (American)	£110, f.o.b., New York.

ALUMINIUM.

Description.	Price per ton on sale to refiner, delivered at refinery.
Sheet cuttings and rods containing a minimum of 96 per cent. Al.	£160 0 0
Old rolled, etc., containing a minimum of 96 per cent. Al.	120 0 0
Spinnings, punchings, and thin small scrap; also painted and varnished scrap that needs melting, containing a minimum of 96 per cent. Al.	105 0 0
Lump scrap from aero castings and material of equivalent value, containing 87 to 95 per cent. Al.	100 0 0
Turnings and Swarf generally, containing 87 to 95 per cent. Al.	87 10 0
Scrap, generally containing 80 to 86 per cent. Al.	80 0 0
Swarf and inferior Swarf, generally containing below 80—86 per cent. Al.	70 0 0
All Scrap, containing below 80 per cent. Al., not to exceed	65 0 0
All Swarf, containing below 80 per cent. Al., not to exceed	60 0 0

SCRAP MATERIALS (LONDON PRICES).

Brass, Heavy Selected	£90
Copper, Clean	£100
Copper, Brazery	£80
Gun Metal, Scrap	£120
Lead, no Draft	£26
Zinc, Old	£40

*Official Prices.
†Includes Selection and Deliverv.
‡Prices include Delivery in the U.K.

AMERICAN INDUSTRIAL NOTES.

It is reported that Messrs. Henry M. Leland and Wiflred C. Leland, who recently resigned their posts as president and general manager of the Cadillac Motor Car Co. of Detroit, Mich., have completed the organisation of a new company with 1,500,000 dol. capital.

The new concern has been registered as the Lincoln Motor Co., and has acquired premises formerly occupied by the Rands Manufacturing Co., in Detriot. Two thousand men will soon be employed, and an output of twenty aero engines per day is expected.

* * *

Mr. S. H. Humphrey has been appointed general manager of the Wright-Martin Aircraft Corporation, New Brunswick, N.J. Mr. Humphrey was formerly manager of Briscoe and Hupp.

Mr. John R. Cautley, who has for some time been engineer for Peter A. Frasse and Co., New York, has joined the staff of the Wright-Martin Aircraft Corporation as engineer at their Washington premises.

* * *

Mr. Charles L. Taylor, president of the Carnegie Fund Hero Commission, has become associated with the Loughead Aircraft Manufacturing Company, of Santa Barbara, Cal. A large site has been acquired, and an important factory is to be equipped within ninety days.

The immense new plant of the Curtiss Aeroplane and Motors Corporation at Buffalo should now be ready for business. Previous estimates had indicated that the plant would not be finished before January 1st.

Despite the fact that the land for the new plant was only secured about three weeks ago, all of the foundations have been laid and two of the bays have been completed. Four miles of track, giving the company the very best of railroad connections, have been laid.

The new plant will occupy nearly 100 acres of land, and will increase present capacity over 600 per cent.

Above facts indicate that the big Government work for aeroplane and parts will be well under way by November 1st. It had not been expected that anything of a substantial character would be started before January 1st.

By the closing two months of the year the Curtiss Co. will be in a position to turn out anywhere from 6,000,000 dollars to 8,000,000 dollars of aeroplane and parts a month. This means business greater each month than was done by the company in the first seven months of the current year.

By the first part of 1918 it is expected that business will be turned out at close to 10,000,000 dollars a month, and if there is no falling down in present plans the capacity will ultimately be brought up to better than 12,000,000 dollars a month.

* * *

Mr. Henry Ford announces that the Ford Motor Company is now making 200,000 steel aeroplane cylinders for the United States Government which are to be delivered at the rate of 1,000 per day.

* * *

The Zenith Carburettor Co., of Detroit, is building an addition to its present factory which will permit an increase of 80 per cent. in production capacity.

* * *

Egbert B. Cresswell, formerly sales manager of the Thomas Aeroplane Co., of Ithaca, N.Y., died on September 9th as the result of injuries received while flying at the Davenport Aviation School, where he was manager. Mr. Cresswell was esteemed by all those concerned with the American aircraft industry, and was regarded as a most promising business man.

THE GRAHAME-WHITE SWIMMING CLUB GALA.

The first annual Gala of the Grahame-White Swimming Club was held at the Hampstead Baths, Finchley Road, on Sept. 29th.

Among the spectators present were Mrs. Winston Churchill, the Hon. Mrs. Henley, Mr. and Mrs. C. Grahame-White, Mr. H. Matthews, Mr. Wilie, Mr. Blessley, and Inspector Parker. The Grahame-White Orchestra made its début on this occasion, and rendered some catchy music throughout the evening.

The Gala was declared open by Mr. H. Matthews, one of the Company's oldest directors, who hoped that such entertainments would be the means of stimulating a sociable feeling among the employees, and putting them more in touch with one another. A special attraction in the programme was an exhibition of diving by Mr. Biggs, superintendent of the baths, accompanied by the lady attendant, which was greatly appreciated by the audience.

At the conclusion the prizes were presented by Mrs. Winston Churchill, assisted by Mr. Grahame-White.

The following is the list of prize winners:—

Ladies' 60 yards: 1st, Miss G. Thomas; 2nd, Miss G. Bellew; 3rd, Mrs. Cotton.

Men's 60 yards: 1st, W. Rezac; 2nd, R. Cook; 3rd, J. Tizzard; 4th, F. Cole.

Three Lengths Sealed Handicap (Club Final): 1st, Wm. Wier; 2nd, A. Hood; 3rd, F. Feldman.

Ladies' 60 yards Open Event: 1st, Miss Blandford; 2nd, Miss De Coverley.

40 yards Scratch (Club Championship): 1st, H. Stewart; 2nd, J. Desack; 3rd, G. Rogers; 4th, Crutchley.

Men's 30 yards Club Learners Race: 1st, H. Brightman; 2nd, W. Ward; 3rd, W. Law.

Men's 60 years Team Race: B. T. H. M. Co. 1st.

Men's 60 yards International Race: 1st, W. Weir; 2nd, J. Desack.

The final for Mrs. Churchill's Challenge Cup, and the Hon. Mrs. Hendley's Trophy, to be won on points throughout the season: 1st, A. Hood, 26 points; 2nd J. McCullock, 25 points; 3rd, C. Tilston, 22 points.

The Club Diving Competition was won by: 1st, E. Wholey; 2nd, J. Desack; 3rd, C. Tilston.

THE ESSENTIAL OIL.

It is of interest to note that the F.I.A.T. engine of the S.I.A. biplane in which Captain Laureati made a non-stop flight from Turin to London, a distance of 686 miles, in 7 hrs. 25 mins. was lubricated with Vacuum Gargoyle Mobiloil "B." The qualities of a lubricating oil become very evident in a long flight of this description.

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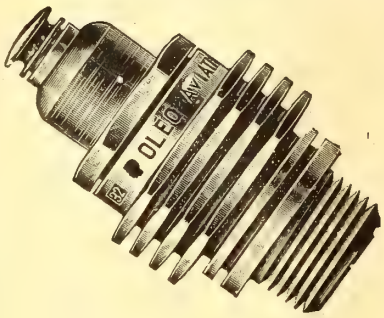
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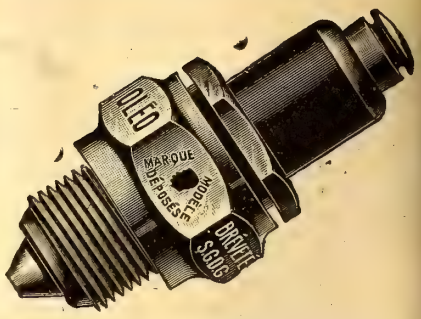
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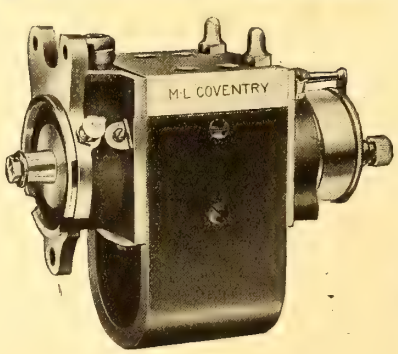
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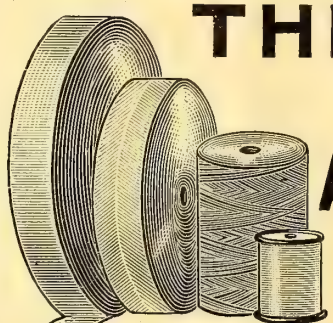
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AIRCRAFT FINANCE

CURRENT TOPICS.

To Capitalists and Investors.

The Aeroplane Industry as a field for investment has not so far received the attention of the serious capitalist that the enormous possibilities of its coming earning power as a commercial proposition merit and call for. No intelligent observer of events can fail to be struck by the indisputable fact that every day the most important space in every prominent newspaper and journal is devoted to events connected directly or indirectly with the aeroplane. Even with the war occupying the minds of all to the exclusion of other events, constant announcements appear of the marvels to be accomplished and the important rôle which the commercial aeroplane is destined to play immediately peace once again reigns supreme.

A new industry always offers exceptional opportunities to the far-sighted capitalist. It was so with mechanical engineering a century ago, when steam power was first known, and again with electrical engineering at a more recent period. The advent of the cycle and the automobile industries are further illustrations of the same characteristic fact. The investor gifted with a little foresight and the courage of his knowledge, found these inventions a quick road to prosperity.

At the moment it is only right and proper that the aeroplane should be considered solely as an implement of war. Its rapid development and multiplication is distinctly attributable to the war, but the commercial possibilities are altogether independent of this factor. War has been, without question, the stimulating element which has given us aircraft of speed, dimension and power such as it has become to-day. But in any case it was sure to have come.

The difference is that for the supreme purposes of war progress has been made in three years which, for mere purposes of peace, might not have been accomplished in ten or more years. As a result of this progress aviation for commercial purposes will be a practical proposition as soon as peace is restored.

With the coming of peace we shall witness the beginning of a new era in travel, with the regular conveyance by the air, day by day, and throughout the civilised world, of mails, passengers, and the lighter kinds of merchandise. Having got so far as a consequence of the world war, it is quite certain that the scientific men who have been working at the problems of aviation during the last three years will not desist when the great conflict is over. With commercial aviation as a "going concern," they will have every inducement to continue their efforts, but with a different goal—not the greater efficiency of fighting machines, but their greater safety, reliability and comfort as a means of transit.

Flying Trains.

Already we hear of planes being prepared along these lines. The British Press recently published a cable from Reuter's correspondent, who had had an interview with the Brothers Caproni, the celebrated Italian aeroplane constructors. Although naturally prevented, for obvious reasons, from giving any details regarding their factories, they stated that the factories were working day and night, and employing five thousand workmen. These factories at present cover four times the area they occupied before the war.

Signor Caproni believes that the development of aviation will increase after the war, and that the day is approaching when lines of aeroplanes will connect town with town, country with country, and continent with continent, with aerial trains, luxuriously fitted up, capable of transporting upwards of a hundred passengers, and of travelling from 125 to 190 miles an hour.

Aeroplanes for this purpose, they say, of from 300 to 500 h.p., will be built according to the biplane and multiplane system, because plurimotor types obviously afford a genuine guarantee of safety. The introduction of the multimotor system, according to the Signors Caproni, would almost entirely obviate the interruption of journeys through the breakdown of the motor. Immediately after the war large trans-oceanic aeroplanes will be constructed powerful enough to carry fifty to sixty passengers from Europe to America and back.

The Caproni triplanes, they point out, can easily carry thirty passengers between Milan and Turin. A Caproni biplane, piloted by Signor Gabriele d'Annunzio, with three others on board, recently accomplished, without landing, a flight of 875 miles.

These are not idle dreams, and it will be well for the cautious investor to take the future of aviation, as a means of rapid commercial transport, into his calculations. At the same time, he must be on his guard. Already one hears of several schemes being prepared to foist unsound "wild-cat" propositions under the guise of Aeroplane Companies upon an innocent public, but every effort will be made by this paper to prevent the industry being sullied by such attempts and manœuvres, and it will not fail in its duty whenever the occasion presents itself.

Defence of the Realm Regulations.

Directors of public companies and particularly secretaries, as well as shareholders, will do well to make a careful note of the Treasury requirements with regard to the declaration which existing regulations demand should be endorsed on every transfer of shares. Unless this formality is complied with, the authorities will refuse to stamp the transfer, which, without the "ad valorem" stamp duty affixed, is invalid, and all parties to the document liable to heavy penalties. The declaration has to be made in the following set form :—

Declaration by Transferor.

"I hereby declare that I am not a person resident or carrying on business in any country at war with Great Britain, or treated as an enemy under any proclamation relating to trading with the enemy, or a member of a body of persons mentioned in the Statutory List under the Trading with the Enemy (Statutory List) Proclamation, 1916, No. 3, or an enemy subject within the meaning of the Trading with the Enemy Amendment Act, 1916, and that the within written transfer is not made by me on behalf of any such person as aforesaid."

Signature.....

Declaration by Transferee.

"I hereby declare that I am not a person resident or carrying on business in any country at war with Great Britain, or treated as an enemy under any proclamation relating to trading with the enemy, or a member of a body of persons mentioned in the Statutory List under the Trading with the Enemy (Statutory List) Proclamation, 1916, No. 3, or an enemy subject within the meaning of the Trading with the Enemy Amendment Act, 1916, and that the within written transfer is not made to me for the benefit of any such person as aforesaid."

Signature.....

CURRENT SHARE QUOTATIONS.

The following are the share quotations made up to Tuesday morning in each week of the principal companies engaged in the Aircraft Industry and Kindred Trades.

Aircraft Mnfg. Co.	7% cum. pref. £1 ...	23 -	24/-
Armstrong Sir W. (G.) Whitworth & Co., Ltd.	4% cum. pref. £5...	3¼	3⅜
	5% 2nd. pref. £1 ...	16/-	17/-
	£1 ordinary	38 6	39/6
Austin Motor Co., Ltd.	7% cum. pref. £1...	18/-	19/-
	£1 ordinary	26/6	27/6
Birmingham Small Arms Co., Ltd.	£1 ordinary	56/-	57/-
	5% cum. "A" pref.	4-5/16	4-7/16
	6% cum. "B" pref.	19/6	20/6
Boulton & Paul, Ltd., 5% cum. pref. £1		⅜	⅞
Brown Bros., Ltd , 6% cum. pref. £5...		4⅛	4⅜
Darracq (A) & Co. (1905) Ltd.	£1 ordinary ...	35/-	36/-
	7% cum. pref. £1 ..	22/6	23/6
Electric Construction Co., Ltd.	7% cum. pref. £1...	19/3	19/6
	£1 ordinary	1	1-1/16
Fellows Magneto Co., 8% cum. partip. pref.		17/-	18/-
General Electric Co., Ltd.	6% cum. pref. £10	10-5/16	10-7/16
	£10 ordinary	17	18
Gwynnes, Ltd., 5% cum. pref.		91/-	92/-
Ordinary		8/3	8/6
Greenwood & Batley, Ltd., £10 ordinary		9	10
Humber, Ltd., 6% cum. pref. £1		17/-	18/-
£1 ordinary		17/-	18/-
Napier (D) & Son, Ltd., 7½% cum. pf. £1		18/-	18/6
Peter Hooker, Ltd., £1 ordinary ...		21/-	22/-
7% cum. partic. 1st pref.		20 -	21/-
Rolls Royce, Ltd. £1 ordinary		57/6	58/6
Rudge Whitworth, Ltd. £1 ordinary ...		43/-	44/-
Ruston, Proctor & Co., Ltd.	£1 ordinary	26/-	27/-
	5% cum. pref. £1 ...	17/-	17/6
Sunbeam Motor Car Co., Ltd., £1 ord...		88/-	90/-
Straker Squire, Ltd. (1913), £1 ordinary		23/-	24/-
S. Smith & Son, Ltd. (Motor Accessories) £1 ordinary		26/-	27/-
Triplex Safety Glass, £1 ordinary... ...		22/-	23/
Vickers, Ltd., 5% pref. stock...		78	82
5% pref. shares. £1 ...		17/-	18/-
£1 ordinary		39/-	40/-
Wm. Beardmore & Co., Ltd., 6% c. pf. £1		19/-	19/6

GENERAL INFORMATION.

Armstrong, Whitworth (1916).
Austin Motor (1916).
B'ham. Small Arms (1915-16).
Rolls Royce.
Rudge Whitworth.
Straker-Squire (1915).
Sunbeam Motor.
Thorneycroft (J. I.) & Co.
Vickers (1915 and 1916).

Owing to the difficulty of estimating liabilities under Finance and Munitions Acts, the accounts will not be ready until a later date.

CLOSING OF TRANSFER BOOKS.

The Transfer Registers of Straker Squire, Ltd., will be closed from October 24th to November 7th, inclusive.

BALANCE-SHEETS.

A. DARRACQ & CO.—The Report and Balance-sheet for the year ending September 30th last has just been issued. The annual meeting of shareholders is convened to be held at Salisbury House, E.C., on the 29th inst., at noon. The accounts to hand show a net profit for the year amounting to £125,015, after writing off depreciation of buildings and other charges shown in the profit and loss account. This net profit, added to the sum of £12,015 brought forward from last year, gives a total to the credit of the profit and loss account of £137,030. After payment of the half year's dividend at the rate of 7 per cent. per annum on the Preferred Ordinary shares, distributed on April 2nd, 1917, amounting to £13,215, and an Interim dividend on the Ordinary shares of 5 per cent., paid on April 16th, 1917, amounting to £13,750, there remains a balance to the credit of profit and loss account of £110,155. The directors have transferred £30,000 to reserve account, making the same up to £200,000, and now propose, after providing for the dividend on the Preferred Ordinary shares, paid October 1st, 1917, which amounted to £13,125, to declare a further dividend at the rate of 10 per cent. on the Ordinary shares, which will absorb £27,500, making a dividend of 15 per cent. for the year, and to distribute a bonus of 5 per cent. on the Ordinary shares, amounting to £13,750. If the dividend recommended on the Ordinary shares be approved by the shareholders, a further dividend at the rate of 3 per cent. per annum on the Preferred Ordinary shares, amounting to £11,250, will be payable under the Articles of Association of the company to the holders of the Preferred Ordinary shares. There remains after providing for the above a sum of £14,530, to be carried forward to the next year's accounts. The directors have deemed it wise to treat one-quarter of the total distribution for the year to the holders of the Ordinary shares as a special bonus. The net profit of £125,015 compares with the previous year's result of £90,500, and the income derived from the operating concerns amounts to £97,300, showing an increase of just over £10,000. The prosperity of this company is very gratifying, and the shareholders and the management are to be congratulated on the results in these trying times.

PENDING ISSUES.

AIRCRAFT MANUFACTURING CO., LTD.—Advice reaches me that an offer will shortly be made of 250,000 Cumulative and Participating "B" Preference shares of £1 each in this company. As soon as full particulars are to hand, due notice will appear in these columns.

WHITEHEAD AIRCRAFT (1917) LTD.—I understand a Prospectus offering shares in this company to the public will shortly be issued. As soon as the Prospectus is issued it will be dealt with in these columns.

STOCK EXCHANGE ANNOUNCEMENT.

Dealings in the following securities have been approved by the Treasury and specially allowed by the Committee under Temporary Regulation 4 (3):—

AIRCRAFT MANUFACTURING CO., LTD.—250,000 Seven per Cent. Cumulative Participating "B" Preference shares of £1 each. After issue of allotment letters.

NEW COMPANIES REGISTERED.

AERO-ACCESSORIES, LTD.—Registered Oct. 13th to establish and carry on the business of manufacturers of parts and accessories for aeroplanes, etc. Nominal capital, £2,000, in 2,000 £1 shares of which 500 are Preference shares and 1,500 are Ordinary shares.

AIRCRAFT EQUIPMENT COMPANY, LTD.—Actinoræ Works, Oaklands Road, Cricklewood, N.W. Registered Oct. 13th to conduct and carry on business as engineering, metal workings, and general inventors, specialists, etc. Nominal capital, £2,500, in 2,500 £1 shares.

G. A.

ANSWERS TO CORRESPONDENTS.

A Financial Specialist will be pleased to answer in these columns inquiries on any subject affecting or relating to Investments, Stocks, Shares and Securities of Aircraft and kindred companies, free of charge.

R. F. C. (Notts).—A private company is not compelled to publish or file accounts, but every shareholder of the company is entitled to a copy of the balance-sheet, and can legally demand same as his right, but no other than a shareholder can compel the company to disclose its financial position; and a private company is not under any obligation to file a copy of its balance-sheet with the Registrar of Joint Stock Companies, as is the case with a public company under the Limited Liability Acts.

"YOKEL" (Leeds).—As a shareholder in the company you are entitled to a copy of the Memorandum and Articles on payment of 1s., even though the company is a private one. The Act, in fact, stipulates that a company refusing to comply with such a demand is liable to a fine not exceeding £1 for each offence, but unfortunately the Act does not define any limit of time, and the company, if to their interest, instead of doing so, may keep you waiting until you show them that you have a legal knowledge of your rights. But, of course, it is always open to you to inspect the file of documents relating to the company, at Somerset House, on payment of a search fee of 1s., and obtain the knowledge you want on any specific point.

THE SAMUEL WHITE SPORTS.

On a recent Saturday, the newly-formed Sports Club connected with the works of J. S. White, Ltd., of Cowes, held their first athletic meeting at the firm's aerodrome, some 2,000 persons being present. The proceeds were in aid of the Northwood House Hospital.

The results of the various competitions were as follows:—

100 Yards Flat (run in four heats) for the Works Championship.—Final: 1 Crossley, 2 Nicholson. Time, 11 sec.

Ladies' Potato Race: 1 Miss Perkins, 2 Miss Linington.

High Jump: Crossley, 4 ft. 9 in.

Ladies' 80 Yards Flat (championship): 1 Miss R. Blow, 2 Mrs. Mortimer.

Bolster Bar Competition: Storey.

Ladies' Egg and Spoon Race: 1 Miss Lewis.

Sack Race: 1 Taylor, 2 Keep.

Long Jump: Crossley, 17 ft. 1 in.

In addition, a number of fancy competitions took place.

The visitors included Lady Marshall, wife of Sir James Marshall, K.C.B., deputy chairman of J. S. White & Co., Ltd.; Lady Baring, commandant of the Northwood House Red Cross Hospital; Mrs. Carnt, Mr. and Mrs. John Smith, Capt. Ham, C.B., and Mrs. Ham, Mr. George Fardell, Mrs. Compton Paterson, and Mrs. Tracey.

The firm entertained the management and staff to tea, as well as a number of convalescent soldiers.

CONGRATULATIONS.

DUKINFIELD-JONES—TENNENT.—The wedding of Mr. A. Dukinfield Jones, the well-known pilot for Wm. Beardmore & Co., Ltd., of Glasgow, to Evelyn, daughter of Mr. Hugh Tennent, of 5, King's Gate, Glasgow, and Holland House, West Kilbride, Ayrshire, will take place to-morrow (the 25th inst.), at 2.30 at the English Church (St. Mary's), Great Western Road, Glasgow. The wedding will be a very quiet one, and there will be no invitation or reception, but friends will be very welcome at the church.

The best man is to be Lieut. Brian Dodds, R.N.V.R., from the Air Board, who was associated with Mr. Dukinfield-Jones in the late lamented firm of Howard Flanders, Ltd. Mr. Dukinfield-Jones' excellent work for aviation in general is well known to all concerned with aircraft before the war, and all his old and new friends will wish him and his bride long life and happiness.

AIR RAID RELICS.

The Admiralty have sanctioned the sale for charity of parts of the Gothas brought down in Thanet during the raid of August 22nd. The wreckage has been broken up and packed into 1,500 parcels, which are to be disposed of at Margate under the direction of the Commanding Officer of a Kentish aerodrome. The souvenirs will be sold at a minimum price of half a crown on behalf of local deserving institutions and other charities.

[Incidentally, is it true that a perfectly good German engine is to be presented to a local corporation as a decoration for the local town hall, instead of being put to military or naval use?—Ed.]

WOMEN'S WORK.

In opening an exhibition of women's munition work on Oct. 22nd, the Lord Mayor of Birmingham said we had not yet reached the maximum output of munitions necessary to win the war. In view of the possible further drain upon the manhood of the country, it was urgent that women should be fully utilised.

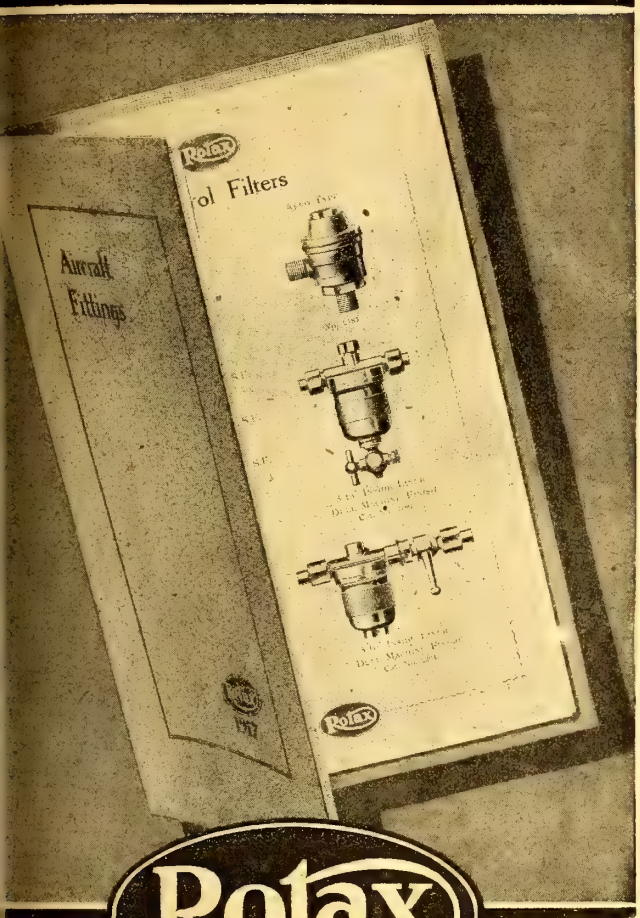
Mr. Waldron, of the Ministry of Munitions, said that aeroplane engines were now turned out entirely by women.

THE TELEPHONE SERVICE.

The Postmaster-General earnestly appeals to the public to refrain from using the telephone during and immediately after an air raid.

The telephone plays an important part in the arrangements for the defence of the country. Calls on personal matters not only obstruct such arrangements, but also delay pressing calls to fire brigades, police, and ambulance stations, and hospitals.

Inquiries for information cannot be dealt with by telephonists working at high pressure during public emergencies, and private calls must necessarily give way at such times to urgent calls of public and national importance.



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(*Continued from page* 1176.)

WOUNDED.—Dowdall, Sec. Lt. E. S., Lond. R., attd. R.F.C.
Lepraik, Lt. D. F., Mdx. R., attd. R.F.C.
MISSING.—Carroll, Sec. Lt. C. E., R.G.A., attd. R.F.C
Richardson, Sec. Lt. R. H., R.F.C.
PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER IN GERMAN HANDS.—Guy, Capt. C. G., North'd R., attd. R.F.C.
Reported Oct. 19th.
WOUNDED.—Findlay, Lt. W. F., R.F.C.
Morris, Sec. Lt. R. S. V., R.F.C.
MISSING.—Berry, Sec. Lt. F. H., R. Scots, attd. R.F.C.
Bush, Lt. J. C., M.C., Dorset R., attd. R.F.C.
Reported Oct. 20th.
KILLED.—Laird, Sec. Lt. H. W., R.F.C.
Tyrer, Sec. Lt. J. R., Manch. R., attd. R.F.C.
DIED OF WOUNDS.—Long, Sec. Lt. J. T., R.F.C.
WOUNDED.—McGregor, Sec. Lt. G. S., R.F.C.
Rooper, Capt. W. V. T., Yeo., attd. R.F.C.
MISSING.—Diamond, Lt. J., M.C., K.O. Sco. Bord., attd. R.F.C.
Powell, Lt. D. G., S. Wales Bord., attd. R.F.C.
Wattson, Sec. Lt. C. B., R.F.C.
Reported Oct. 22nd.
KILLED.—Gibson, Sec. Lt. E. D., R.F.C.
Marsh, Sec. Lt. Z. S., R.F.C.
Pierson, Sec. Lt. C. F. K., R.F.C.
Smith, Sec. Lt. V. S., R.F.A., attd. R.F.C.
Torry, Sec. Lt. A. J. D., M.C., R.G.A., attd. R.F.C.
Wates, Sec. Lt. L. C., R.F.C.
PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—Bond, Capt. W. A., M.C., K.O. (Yorks L.I.), attd. R.F.C.
Clarke, Sec. Lt. H. C., D. of Corn. L.I., attd. R.F.C.
Curtis, Sec. Lt. H. N., R.F.C.
Fenwick, Sec. Lt. W. C., R.F.C.
Hayes, Sec. Lt. R., R.F.C.
Henderson, Sec. Lt. T. E., S Staffs R.
Jennings, Capt. A., R.F.A., attd. R.F.C.
Miller, Lt. A. W. B., K.O. Sco. Bord., attd. R.F.C.
Neate, Capt. N. R., M.C., Royal Fus.
Roberts, Sec. Lt. E. J., R.F.C.
Robertson, Capt. C. E., R.F.C.
Roux, Sec. Lt. F., R.F.C.
Welch, Lt. H., R.F.A. and R.F.C.
DIED OF WOUNDS.—Duvall, Rev. J. R., A. Chap. Dept.
Richards, Lt. M. T., M.G.C.
Sogno, Sec. Lt. G. F. R., Suss. R., attd. R.F.C.
Thirlwell, Capt. T. A., R.E.
Wilkinson, Lt. E. R., M.C., R.F.C.
WOUNDED.—Alexander, Sec. Lt. D., R.F.C.
Gardener, Sec. Lt. G. C., R. Ir. Regt., attd. R.F.C.
Gitsham, Sec. Lt. T. L., R.F.C.
Hackman, Sec. Lt. W. G. C., Hamps R., attd. R.F.C.
Hamilton, Sec. Lt. C. W., R.F.C.
Hills, Sec. Lt. E. A. R., R.F.C.
Wadham, Lt. N. W., Rif. Brig., attd. R.F.C.
MISSING.—Brasington, Sec. Lt. F. T., R.F.C.
Begg, Lt. M. G., M.C., Rif. Brig., attd. R.F.C.
Hill, Lt. R. F., A.S.C., attd. R.F.C.
MacMurchy, Sec. Lt. I. U., R.F.C.
Peacock, Sec. Lt. M. A., R.F.C.
Philpott, Capt. J. R., M.C., R.F.C.
Stockhausen, Lt. I. L., B.W. Ind. R., attd. R.F.C.
PREVIOUSLY REPORTED MISSING, NOW REPORTED DIED OF WOUNDS AS A PRISONER OF WAR IN GERMAN HANDS.—Higginbottom, Sec. Lt. F., Ches R., attd. R.F.C.
Tapp, Lt. H. D., R.E., attd. R.F.C.
PREVIOUSLY REPORTED PRISONER OF WAR, NOW REPORTED DIED OF WOUNDS AS A PRISONER OF WAR IN GERMAN HANDS.—Richards, Sec. Lt. H. S., Sher. For., attd. R.F.C.
PREVIOUSLY REPORTED KILLED, NOW REPORTED WOUNDED AND PRISONER OF WAR IN GERMAN HANDS.—Grace, Capt. H. C., North'n R.
PREVIOUSLY REPORTED MISSING, NOW REPORTED WOUNDED AND PRISONERS OF WAR IN GERMAN HANDS.—English, Sec. Lt. W., R.F.C.
Gibson, Sec. Lt. J., R. Scots.
Wheeler, Sec. Lt. L. F., R.F.C.
PREVIOUSLY REPORTED PRISONER OF WAR, NOW REPORTED WOUNDED AND PRISONER IN GERMAN HANDS.—Horne, Capt. O. W., M.C., Essex R.
PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONERS IN GERMAN HANDS.—Adamson, Sec. Lt. C. P., R.F.C.
Garland, Sec. Lt. E. H., R.F.C.
Hudson, Capt. A. R., Yeo., attd. R.F.C.
Manners-Smith, Lt. J. A., R.G.A., attd R.F.C.
Skinner, Sec. Lt. A. H., R.F.C.
Smith, Sec. Lt. G. M., A.S.C., attd. R.F.C.
Thompson, Sec. Lt. S., R.F.C.
Wilkinson, Lt. D. S., R.F.C.
CANADIAN CONTINGENT.—PREVIOUSLY REPORTED MISSING, NOW REPORTED DIED.—McNilly, Lt. P. B., Alta Regt., attd. R.F.C.
WOUNDED.—MacAloney, Lt. C. W., N.S.R., attd. R.F.C.
Van-der-Byl, Lt. R. I., B.C.R., attd. R.F.C.
MISSING.—Chambers, Lt. W. D., Can. A.S.C., attd. R.F.C.
Long, Lt. G. R., Man. R., attd. R.F.C.
PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER IN BULGARIAN HANDS.—Baillon, Lt. E. N., B.C. Regt., attd. R.F.C.
Reported Oct. 23rd.
PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—Bentley, Sec. Lt. G. W., R. Fus., attd. R.F.C.
Dennis, Sec. Lt. C. C., Lond. R., attd. R.F.C.
WOUNDED.—Jones, Sec. Lt. H. E., R.F.C.
Kewley, Sec. Lt. W. G., R.F.C.
Shipwright, Sec. Lt. D. E. B. K., R.F.C.
Wigle, Sec. Lt. G. B., R.F.C.
MISSING.—Edwards, Lt. A. W., R.F.C.
Hill, Lt. R. I. V., Welsh R., attd. R.F.C.
Wilkinson, Sec. Lt. G. M., D.C.L.I., attd. R.F.C.

* * *

CASUALTIES AMONG WARRANT OFFICERS, N.C.O.'s AND MEN.
THE DATES ARE THOSE OF THE OFFICIAL LIST.

KILLED.

OCT. 11th.—R.F.C.—Matthews 1712 2nd Cl. Air Mech. H. (Worthing).

DIED OF WOUNDS.

OCT. 9th.—R.F.C.—Potter 93971 Sjt. F. (Leyton, E.); Rober 332 Sjt. W. H. (East Ham, E.).
OCT. 13th.—Fairclough 8696 2nd Class Air Mech. W. (Blac pool); Farmer 77648 2nd Class Air Mech. F. (Derby); Wo 42899 2nd Class Air Mech. A. E. (Torquay).

ACCIDENTALLY KILLED.

OCT. 12th.—R.F.C.—Mann 65459 2nd Class Air Mech. L. Hastings.

DIED.

OCT. 8th.—R.F.C.—Reynolds 12360 1st Class Air Mech. H. (Melton Mowbray).

WOUNDED.

OCT. 9th.—R.F.C.—Casserley 13488 2nd Class Air Mech. E. (Harringay, N.); Fraser 43267 2nd Class Air Mech. J. (F tess Rd., N.W.); Henley 44363 2nd Class Air Mech. A. (Walthamstow, E.); Mariner 7502 1st Class Air Mech. B. V. (Twyford); Mitchell 9519 Cpl. E. (Cleethorpes); N 44266 2nd Class Air Mech. H. L. (Watford); Pierson 59 2nd Class Air Mech. F. H. (Folkestone); Seward 9711 2 Class Air Mech. W. G. (Highgate, N.)
R.F.C., ATTD. R.G.A.—Lister 10220 1st Class Air Me W. E. (Blackpool).
OCT. 10th.—R.F.C., ATTD. R.G.A.—Peacock 10700 2nd Class Mech. R. (Bradford).
OCT. 11th.—R.F.C.—Clarkson 30495 Cpl. F. (Bishop Aucklan Fox 57765 2nd Class Air Mech. A. L. W. (Scarboroug McBain 29730 2nd Class Air Mech. D. (Govan).
OCT. 12th.—Cowling 8976 1st Class Air Mech. A. E. (So Woodford, E.); Martin 5711 1st Class Air Mech. H. (Streatham, S.W.).
OCT. 13th.—Chippendale 17833 2nd Class Air Mech. H. R. (I lington Park, N.); Drinkall 68331 2nd Class Air Mech. (Grimsby); Lilley 82873 2nd Class Air Mech. S. (Yor Ottey 78602 1st Class Air Mech. S. (Leicester); West 55 2nd Class Air Mech. J. C. M. (Gifford, Co. Down).

MISSING.

OCT. 12th.—R.F.C.—Edgington 1384 Sjt. S. (Woodley, Re ing); Hamer 6161 Cpl. J. H. (Radcliffe).
OCT. 13th.—Roebuck 5788 Act. Sjt. W. H. (Bolton.)

PERSONAL NOTICES.

DEATHS.

ADAMS.—Sec. Lt. John Percy Fitzherbert Adams, Durh L.I., attd. R.F.C., was killed on October 14th while carry out his duties as an observer. A sudden attack was made u his machine in the air by a hostile machine, and an engagem ensued at close quarters, but after the firing of five rounds pilot observed that no more were fired by Mr. Adams, and he once came down successfully on our side; the machine was m damaged, and the observer dead and still holding his gun.

Mr. Adams was the second son of Colonel Herbert Ada V.D., and Mrs. Adams, and was educated principally at St. E School, St. Augustine's College, Canterbury, and Durham U versity. He had a great reputation as a Rugby football pla He was ordained deacon at Advent, 1914, and proceeded shortly to St. John's, Newfoundland, as a curate. There remained until the following September, when he obtained sanction of his bishop to come home to take up arms, and soon obtained his commission in the Durham L.I.

In June, 1916, he left England for the front, and was s wounded by shrapnel. After about three months he was pas for duty again, and subsequently returned to the front and more fighting, and afterwards volunteered for the R.F.C., j ing a squadron after a few weeks' training in England. He highly esteemed as a capable and gallant officer. He was years of age.

CHAPMAN.—Sec. Lt. A. J. Chapman, R.F.C., was the e

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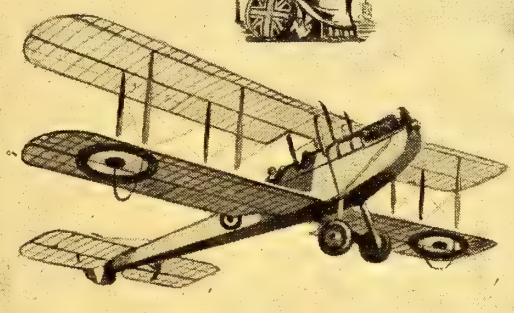
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son of Mr. J. B. Chapman, Town Clerk of Burton-upon-Trent, and Mrs. Chapman. Educated at Hymers College, Hull, he was articled as a solicitor to Messrs. Drewry & Newbold, of Burton-upon-Trent, in 1913, and passed his intermediate law examination in the summer of 1914. On the outbreak of war he enlisted in the Public Schools Battalion of the Royal Fusiliers, and was in France from November, 1915, to April, 1916. He then came back to England, having been recommended for a commission, and received instruction as an infantry officer. He was, however, gazetted to the R.F.C., and after instruction was engaged on testing new machines. He left for the Front on June 13th, and was engaged on patrol work, and on several occasions took part in attacking the German infantry. He came home on leave on September 1st, arriving back at the Front on the 17th. On the following morning he went out on patrol, and did not return.

His commanding officer writes that "a message was received from a German aeroplane stating that Sec. Lt. A. J. Chapman was killed in an air fight near Cambrai on September 18th." He added: "Knowing your boy as I did, I can only say that he would have chosen no other death had he been given to choose, and that I am sure that he died happily in that he gave his life for his country and for you. This message has come as a great blow to me and to his brother officers."

CRUIKSHANK.—Capt. Guy Lindsay Cruikshank, D.S.O., M.C., Gordon Highlanders and R.F.C., reported missing on Sept. 15th, 1916, now reported killed on that day, was 26 years of age. He was educated at King's School, Rochester, and Emmanuel College, Cambridge. At the outbreak of the war he was stationed at the Central Flying School, Upavon, was one of the first to cross the Channel with his squadron, and was in the fighting line continuously until his death. He received the Military Cross in June, 1915, and in September of the same year was awarded the D.S.O. for "conspicuous gallantry in successfully carrying out a special mission involving great risk." He was mentioned twice in dispatches.

DAVIS.—Lt. Basil R. Davis, Royal Fusiliers and R.F.C., who was killed in action on Sept. 20th, was the second son of Mr. and Mrs. A. E. Davis, 18, Wetherby Mansions, S.W. He was 22 years of age.

DE LACEY.—Sec. Lt. De Lacey, West Yorkshire Regt., attd. R.F.C., who was killed in action on Sept 23rd, was the only son of Dr. and Mrs. De Lacey, 4, Jesmond Road, Newcastle-on-Tyne. He was 22 years of age.

FERREIRA.—Cpl. Augustus Ferreira, of the Australian Flying Corps, aged 28, whose home is at Melbourne, has died in hospital at Birmingham from blood-poisoning. He scratched his finger against a corrugated iron fence when leaving a bicycle against it, the injury being so slight at first that he took no notice of it.

GILBERT.—Sec. Lt. Gilbert, R.F.C., was killed at Carshalton on Oct. 18th. His machine fell into the grounds of the hospital.

GLEED.—Sec. Lt. John Victor Ariel Gleed, R.F.C., who was reported missing on July 7th, and is now officially reported to have been killed on that day, was the elder son of Mr. J. W. Gleed, vice-chairman of the Holland County Council, and Mrs. J. W. Gleed, of West Elloe, Spalding, Lincs. He was 20 years of age, and was educated at Lydgate House, Hunstanton, and at Uppingham, where he represented the school at hockey and fives, was in the school second eleven at cricket, and was most efficient at all outdoor pursuits. On leaving Uppingham at Easter, 1916, he received his commission in the R.F.C., obtained his "wings" in September, and went to the Front last June. On July 7th he took part in a great air combat over the enemy's lines, and now appears in an official German list as having died on that day.

INGLIS.—Sec. Lt. Robert Anderson Inglis, R.F.C., who was reported missing on September 21st last, is now reported killed on that date, in his 19th year. The news of his death has come from the German Flying Corps in a message dropped by them. Mr. Inglis, who was the younger son of Mr. Andrew Glover Inglis, City Coroner of Liverpool, and Mrs. Inglis, of 16, Sefton Drive, Liverpool, was educated at Greenbank School, Sefton Park, and subsequently at Gresham School, Holt, Norfolk. On leaving school he became an apprentice in the office of Messrs. Balfour, Williamson & Co., and December last joined the Inns of Court O.T.C. He subsequently volunteered for flying, and after passing through his course of training went to the Front at the beginning of September.

LLOYD.—Richard Serjeantson Lloyd, R.F.C., who was reported missing on June 18th, and is now officially reported killed, was the eldest son of the late A. H. Lloyd, Sydney, N.S.W. He was 29 years of age.

MACBRAYNE.—Sec. Lt. D. C. H. MacBrayne, R.F.C., who was previously reported missing on June 21st, is now reported killed, aged 19. He was educated at Eton College, which he left in August, 1916, to take a commission in the Royal Flying Corps. He was the son of Mr. D. H. MacBrayne, of 19, Woodlands Terrace, Glasgow, chairman of David MacBrayne, Ltd., and a grandson of the late David MacBrayne, shipowner, Glasgow.

MACLEOD.—Lt. Norwood Macleod, C.F.A., attd. R.F.C. who was killed when returning from aerial action, was th younger son of Henry C. Macleod, of Toronto, whose temporar address is R.A.C., London.

MACKAY.—Ivan Mackay, R.F.C., who has been killed, wa the son of Mr. James H. Mackay, of the well-known firm c Mackay Bros., Ltd., of Johannesburg, Durban, and elsewhere He was educated at St. Andrew's College, Grahamstown, Cap Colony, and, coming over to this country at the end of 1916, gc a commission in the Duke of Wellington's West Riding Reg ment, being afterwards attached to the Royal Flying Corps. H soon displayed unusual efficiency, was promoted to a captaincy and left for the Front about three weeks ago.

A brother-officer writes:—"The loss of Capt. Mackay was very severe blow to the Service, and particularly to this squadron Everyone here had come to recognise in him a most gallan officer, who, had he lived, would have brought distinction to th squadron as well as to himself." Another officer writes:—"H was an extraordinarily fine man, and I, who knew him ver well, know that both officers and men loved him dearly."

MANLEY.—Capt. Jack Manley, R.F.C., son of Mr. and Mrs Manley, of Caldicote, Heyford, Oxon, was born in 1897, an educated at Taunton School. He then entered the G.W.R. work at Swindon to learn engineering, but feeling it his duty to joi the Army, he obtained his pilot's certificate, and was gazetted i March, 1916. He was severely wounded in a fight on July 20th 1916, and with one arm useless brought his machine and observe back, and landed safely. After a few weeks in hospital he wa brought to the R.F.C. Hospital in Bryanston Square, where after much suffering, he recovered. He then took up work as a instructor, but later returned to the Front, where he did muc good work on a scout machine. He was killed on Sept. 18th.

MIGHELL.—Lt. Phillip Mighell, East Surrey Regt., attc R.F.C., who was the eldest son of Mr. and Mrs. Phillip Mighel of Manor Farm, Beddington, Surrey, died of wounds received i action on Oct. 12th.

REID AND CAMERON.—A flying accident occurred in Lincolr shire on Oct. 16th resulting in the death of two officers—Cap Guy Reid, who recently won the Military Cross for brilliant wor in France, and had been at the Front about a year, and Sec. L Cameron, of Aberdeen. The machine dropped from a height c 900 feet. Capt. Reid was was the youngest son of Mr. and Mrs T. M. Reid, of Puerto Orotava, Teneriffe. He was 20 years c age.

STEWART.—Lt. A. D. Stewart, R.F.C., who was accidentall killed while flying on Oct. 13th, was the youngest son of the lat Capt. N. P. Stewart, of Plas Lodwig, Bangor, North Wales, an of Mrs. Stewart, of Coolmore, Parkstone, Dorset. He was 2 years of age.

TERRY.—Sec. Lt. John Elliott Terry, R.F.C., who died o Oct. 16th in hospital abroad, was the elder son of Mr. an Mrs. John H. Terry, of Elstree, Herts, and husband of Phylli Terry (née Stockings).

THOMPSON.—Lt. William C. Thompson, R.F.C., was kille while flying at Montrose on Oct. 16th. He was ascending, an when a short distance from the ground the aeroplane fell, wit fatal results. He was a son of Mr. Alfred Thompson, Woodstock Ontario, and was 24 years of age.

TORRIE.—Cadet Leslie Torrie, R.F.C., who died on Oct 21st at the 4th London General Hospital, S.E., was the younges son of Mr. and Mrs. James Torrie, 40, Riggindale Road Streatham. He was 19 years of age.

TORRY.—Sec. Lt. A. J. D. Torry, M.C., R.G.A., attd R.F.C., killed in action on Oct. 9th, was son of the late th Rev. A. F. Torry, Rector of Marston, Bedfordshire, and brothe of Miss E. Torry, 28, Grosvenor Gardens, S.W.1. He receive his commission in the R.G.A. in April, 1915

TYZACK.—Sec. Lt. Eric. Delanoy Tyzack, R.E., attd. R.F.C. who was killed in action on Sept. 15th, was the only son o Frederick Tyzack, Psalter House, Sheffield. He was 26 years o age.

WILKINSON.—Eric Russell Wilkinson, M.C., Middlesex Regt. and R.F.C., who died of wounds on Oct. 7th, was th youngest son of the late C. H. Wilkinson and Mrs. Wilkinson, o 55, St. Mary's Mansions, W.2. He was 23 years of age.

Engagement

HAWARD—DUNCAN.—An engagement is announced between Lieut. Reginald S. Haward, Middlesex Regt., and R.F.C., younger son of Mr. Percy G. Haward and Mrs. Haward, of 17 Ashbourne Avenue, Finchley Road, N.W., and Margaret Edith Balfour Duncan, daughter of Mr. James Duncan and Mrs. Duncan, of Balfour, Brechin, N.B.

Marriages.

BARRY—JONES.—On the 20th inst., at St. Philip's, Earl's Court, Lt. J. Vincent Barry, R.F.C., second son of the late James Barry, of Calcutta, was married to Lois Vera, daughter

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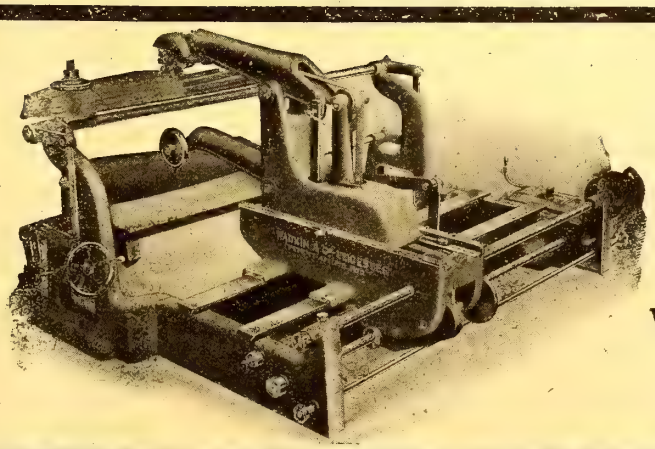
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of the late Harold Jones, M.Inst.C.E., and Mrs. Jones, of 8, Longridge Road, S.W., by the Rev. E. Marling Roberts.

BISHOP—BURDEN.—On Oct. 17th, Maj. W. A. Bishop, V.C., D.S.O., M.C., Canadian Cavalry and R.F.C., was married to Margaret Eaton, daughter of Mr. C. E. Burden and niece of Sir John Eaton, at Toronto.

KILLINGSWORTH—FINCH.—On Oct. 20th, at Christ Church, Streatham Hill, Sec. Lt. Thomas Avern Killingsworth, R.F.C., of Flodden, Tierney Road, Streatham Hill, was married to Lily, daughter of Ernest Finch, Leander Road, Brixton Hill, S.W., by the Rev. W. Godfrey Bell, M.A.

IRONS—SMITH.—The wedding of Capt. Roy Irons, R.F.C. and the Hon. Winifred Smith took place quietly at St. Peter's Church, Eaton Square, on October 24th at 2.15 p.m.

ROME—STILES.—On Oct. 17th, at St. Giles' Cathedral, Edinburgh, by the Very Rev. Dr. Wallace Williamson, Dean of the Thistle and Chapel Royal, and the Rev. Dr. Fisher, Chaplain-in-Ordinary to the King, Lt. S. G. Rome, M.C., Argyll and Sutherland Highlanders and R.F.C., younger son of Col. George Rome, Knockbay, Campbeltown, Argyllshire, was married to Dorothy Jalland, only daughter of Lt.-Col. Harold J. Stiles, F.R.C.S. Ed., R.A.M.C. (temp.), 9, Great Stuart Street, Edinburgh.

BIRTH.

ELLISON.—On Oct. 17th, at 2a, The Grove, Golder's Green, N.W.4., to Marvelle, wife of Lt. Alfred Ellison, R.F.C.—a daughter.

Any news of Sec. Lt. P. C. Norton, R.F.C., who was reported missing on October 13th, will be gratefully received by Sec. Lt. H. P. Norton, R.E., Dunstable Signal Depôt.

* * *

Mr. G. A. Wingfield, of Hove, Sussex, has received a telegram from abroad stating that his son, Lt. L. A. Wingfield, R.F.C., has escaped from Germany and may be expected home shortly. Mr. Wingfield was brought down and taken prisoner on July 1st, 1916, at the beginning of the Somme offensive.

From the "Morning Post" of October 20th:—

A further report received by the West Indian Contingent Committee from the Commander-in-Chief of the Expeditionary Force, regarding the service in that command of certain units of the British West Indies Regiment, which was formed for service in the present war, says:—

"One battalion in June was bombed by a hostile aeroplane whilst on parade, when being inspected by the Brigadier in command of their area. On the occasion five bombs were dropped but the men behaved with the utmost coolness, and were complimented by the General on their steadiness. West Indian troops, alongside English and Indians, are now taking their share in defending the lines of communication. On one occasion a hostile aeroplane landed behind our lines in an endeavour to destroy our railway. The enemy was, however, engaged by a patrol of the B.W.I. Regiment, and the pilot and passenger were obliged hurriedly to return to their machine, leaving their explosives behind them."

* * *

The "Times" correspondent with the British Army in France writes on Oct. 21st as follows:—

The enemy's guns now are chiefly directing attention to our front lines and forward positions, suggesting that either he has not enough guns far enough forward to shell our batteries or back areas heavily, or that he does not wish to use his ammunition. On the other hand, the work of our artillery on the German batteries and objectives behind the lines, as well as the continued bombing and harassing by aeroplanes in spite of moderate visibility, has been incessant, and at times terrific.

Besides the artillery, the German infantry also complain of their aviators. We are constantly getting reports from captured officers and so forth that, in the early morning hours especially, their aviators do not put in an appearance, while "the English come and fire on us in the trenches from a height of 50 metres." That there is truth in this we know. On one day recently nine of our aviators came back, having fired among them over 10,000 rounds from machine-guns on the men in the trenches and shell-holes or moving along the roads.

The air fighting lately has been very bitter, the German tactics now being generally to fly in large squadrons. Thus, recently, ten German machines attacked one British, which was having a disagreeable time when, happily, another British patrol came along and threw itself into the mêlée. One German machine was sent crashing down, and the enemy formation was broken up and withdrew, while our machines came safely home.

In another case five of our machines fell in with fifteen Germans, and a truly gorgeous fight followed. One of our men was attacked by three of the enemy, but shot down one in flames. Another, similarly outnumbered, also accounted for one of the enemy. A third machine had a royal time. He was attacked by what is vagely called a large number of enemies, one of which came close alongside, but before it could do any harm the struts of its planes were shot away, the two wings on one side crumpled together, and the machine went whirling down. Almost simultaneously another German crossed in front of the British machine, and received the next burst from the machine-gun. It broke into flames, and crashed to earth a mass of fire. A third enemy ranged alongside and was sent down out of control, and then the British pilot thought he had done enough, and made for home. He was chased by yet another enemy of the fifteen, and suddenly our man, when close to the lines, with the Germans only 200 yards behind, throttled down and checked to let the enemy pass him. As he passed a burst of fire from the British machine sent him toppling down to the ground.

With six machines to their credit, four of which had been brought down by one, our men came home content.

Similar cases, where three of our machines were attacked by eight or more Germans, have been not infrequent, and the whole record of our Flying Corps in this area has been extraordinarily fine.

* * *

The Canadian papers report that Major Bishop, V.C., D.S.O., R.F.C., entertained an admiring crowd to a marvellous exhibition of flying on one of the instruction aeroplanes at Leaside Camp on October 18th.

A young cadet in another machine proceeded to imitate his feats, and accomplished everything that Major Bishop had done. The cadet was then placed under close arrest for deviating from the instructions given him before he ascended.

FRANCE.

OFFICIAL COMMUNIQUÉS.

OCT. 16th.—Last night (Monday) some German aeroplanes bombarded the region of Dunkirk. There were no victims and there was no material damage.

OCT. 17th.—Towards 7 p.m. enemy aeroplanes violently bombarded Nancy. A number of casualties are reported among the civil population (10 killed and about 40 wounded).

Yesterday (Tuesday) and the day before five German aeroplanes were destroyed, four by our pilots and one by our anti-aircraft guns. Moreover, 20 enemy machines fell out of control in their own lines after air fights.

Our bombing machines carried out various flights. The military establishments of Volklingen, the railway stations of Thionville, Mézieres les Metz, and Metz Woippy, the factories of Hagondange and those of Rombach received a large number of bombs.

OCT. 18th.—Yesterday evening about 6.30 enemy aeroplanes made a new raid on Nancy, and dropped some bombs, causing victims among the civilian population. Yesterday six German aeroplanes were destroyed, and five fell out of control into their own lines.

Our bombing squadrons made several raids. The railway stations of Courcelles (east of Metz), Thionville, Mézières, Novéant (south-west of Metz), and Wavrille (about 10 miles north of Verdun), the factories at Hagondange (north of Metz), and numerous munition depôts and bivouacs were freely bombed.

OCT. 19th.—In the region of Dunkirk during the night about 20 bombs were dropped by aircraft. No victims have been reported.

On October 16th two German aeroplanes were brought down by the 51st section of motor guns.

OCT. 19th.—ARMY OF THE ORIENT.—One of our aviators dropped bombs on the railway station of Ghevgeli.

OCT. 20th.—During the night of October 19th-20th a certain number of Zeppelins flew over French territory without doing any damage. They were shelled in their flight by our anti-aircraft defensive posts, and several of the dispersed airships were brought down or were forced to land.

The first Zeppelin was brought down in flames at St. Clément, 10 kilometres (6¼ miles) south-east of Luneville. The second on being attacked by our aeroplanes had to land near Bourbonne-les-Bains (about 45 miles south-west of Epinal). The crew were taken prisoners. The airship is undamaged.

Two other disabled Zeppelins, attacked by our aeroplanes and defensive posts, came down in the valley of the Saône, and were forced to land in the region of Sisteron (75 miles south of Grenoble). The crews, after setting fire to the airship, attempted to take to flight, but were made prisoners.

OCT. 21st.—On the evening of the 21st inst. German aeroplanes dropped some sixty bombs on the Dunkirk region. No casualties among the civil population are reported.

OCT. 22nd.—Yesterday a German aeroplane was brought down in an air fight, and six others were driven down in their own lines out of control.

In the period from October 11th to October 20th, 19 enemy aeroplanes and three captive balloons were brought down by our pilots or by the fire of our special guns. Besides these, 28 machines were seriously damaged.

* * *

The "Humanité" of October 17th writes:—

The Military Commission yesterday heard the views of the Under-Secretary of State for Aviation and also the observations

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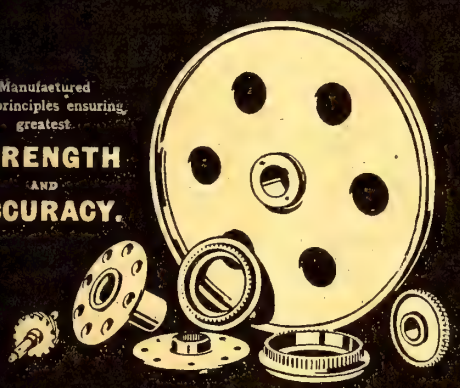
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of some of its members in regard to the methods employed by certain aeroplane and airship manufacturers. The Commission was of opinion that a stop should be put to certain methods which appeared to be prejudicial to the national defence. The Commission and the Under Secretary of State also considered that revision was needed in regard to men and methods, and that Parliamentary control would assist the Aviation Minister in his difficult task.

* * *

A message from Paris on October 19th states that the last mention of Captain Guynemer by General Anthoine in Army Orders was as follows:—

General Commanding Army mentions Capt. Guynemer, commanding No. 3 Squadron, in General Orders of the Army.

Captain Guynemer died on the field of honour on September 11th, a hero of legend, who fell from the high heaven of glory after three years of ardent conflict.

He will be remembered as the perfect symbol of the highest qualities of our race. He showed indomitable tenacity, fierce energy, and blind courage. He was animated by the firmest faith in victory, and he has bequeathed to every French soldier an imperishable memory, which will stimulate a spirit of self-sacrifice and the noblest emulation.

The Chamber has decided by a unanimous vote to place the name of Capt. Guynemer on the commemorative tablets of the Panthéon until his body can be found and buried in that famous hall.

* * *

It is proposed to erect in France an Allied memorial to the aviators who have fallen, and the editors of the "Nouvelle Revue Nationale," 11bis, Impasse de la Visitation, Paris VIIe, have opened a subscription list. They will be glad to receive the exact names and military rank of British aviators who are known to have died on active service in France, so as to correct and supplement such details as are already in their possession.

GERMANY.

Official Communiqué

Oct. 17th.—Ten enemy aeroplanes and one captive balloon were shot down yesterday. Lt. Von Bülow brought down his 23rd opponent, and Lt. Böhme his 20th opponent in aerial battle.

Dunkirk has again been attacked by our aviators, who observed conflagrations which had been caused by their bombs.

By way of reprisal for the dropping of bombs by enemy aviators on open German towns, bombs have been dropped by us on the town of Nancy, lying within the region of French operations. Large fires resulted.

Naval airships dropped bombs on Pernau (on the east coast of the Gulf of Riga, where large fires broke out.

Oct. 18th.—Thirteen aeroplanes were brought down yesterday (Wednesday).

In reply to the aerial attack on Frankfurt bombs were again dropped on Nancy.

Oct. 19th.—Our opponents yesterday lost 12 aeroplanes, six of which were out of a squadron which had dropped bombs on Roulers and Ingelmunster (east of Roulers) with considerable damage to houses.

Our naval forces operating around Moon had several engagements with enemy warships.

Military and naval aviators kept the commanders well informed as to the whereabouts of enemy forces. Both on land and at sea they several times attacked the enemy with perceptible success, using bombs and machine-gun fire.

Oct. 21st.—Nine enemy aviators have been shot down.

Our airships carried out an attack on England during the night of October 19th-20th, which was particularly successful.

Twenty-six tons (26,000 kilos) of bombs were dropped on London, Birmingham, Nottingham, Manchester, Derby, Lowestoft, Hull, Grimsby, Norwich, and Mappleton. Fires were observed.

Four of the Zeppelins which drifted out of their way over the French fighting region were lost. Further particulars are still lacking.

Oct. 22nd.—Twelve enemy aeroplanes and one captive balloon were brought down yesterday (Sunday).

* * *

A message from Zurich on Oct. 16th states that the "Münchener Post," referring to the suggestion that the Allied Air Services should make air raids against Southern Germany as reprisals, says:—

Air attacks on open towns have proved to be the means of stiffening rather than weakening the determination of people, and this applies to all belligerents.

It would be a matter of rejoicing if all the belligerents agree no longer to make this fearful world catastrophe still more horrible through the slaughter of defenceless persons.

Several German papers, in addition to the "Münchener Post," are beginning to question the wisdom and desirability of bombarding open towns from the air. It is interesting to note that this view of air raids only occurs to the Germans when they are threatened with a taste of their own frightfulness.

A Frankfurt telegram says that an enemy aviator appeared above Frankfurt at 1.0 p.m. on Oct. 17th and dropped several bombs, which exploded on uncultivated land and did no damage. The defence guns bombarded the aviator, who disappeared.

* * *

The Royal police authority in Cologne published, on Oct. 18th in the "Cologne Gazette," a notice stating that during the last air attack a large part of the population assembled in the streets and public places to watch the operations of the defence batteries against the enemy aviators. It cannot be emphatically enough said, runs the notice, that this exposes people to great danger, not only from enemy bombs, "but, as the experience of other cities has taught, severe accidents may be caused by fragments of projectiles from defence guns." Persons thus acting are threatened with punishment, as are also those who do not open their doors to those seeking shelter on such an occasion.

[It would seem that there are people who derive entertainment from air raids, even in Germany.—Ed.]

RUSSIA.

Official Communiqués.

Oct. 17th.—Profiting by the calm and bright weather, the enemy has been actively engaged in aerial scouting, principally in the region of the Baltic Islands. Our aviators ascended to meet the enemy. In an aerial engagement our aviator Safonoff brought down an enemy machine, which fell in our lines.

A Zeppelin flew over Moon Sound.

Oct. 18th.—In the night of October 16th-17th a Zeppelin flew over the town of Pernau (north-east corner of the Gulf of Riga) and dropped bombs. Six houses were destroyed.

Attack on Moon Sound:—

Simultaneously a great number of the enemy aircraft dropped many bombs on our ships, and on the harbours of the islands still occupied by our detachments. In these aerial engagements our aviator Lt. Safonoff brought down another machine.

Oct. 19th.—Aviation.— On October 15th on the Roumanian front, aviator Ensign Galcheff brought down an Austrian machine, the enemy aviators being made prisoners.

On October 3rd, while descending to an aerodrome, one of our aeroplanes fell. The pilot, Capt. Konshin, was severely injured, and the observer, Sec. Lt. Gollesen (whose name on October 5th was erroneously reported as Gollias). died from injuries.

The arrival on October 18th is announced at Vladikavkaz of a military aviator who recently started from Tiflis and crossed the Caucasus Mountains, the journey occupying ten hours.

* * *

A message from Petrograd, dated Oct. 19th, stated that all the important works dealing with munitions have already been moved from Petrograd.

Zeppelins are attacking towns considerably inland. This is a sign that Petrograd will not be long left in peace from aerial attacks, especially now that the Germans can build Zeppelin bases within easy distance of the capital.

ITALY.

Official Communiqué.

Oct. 17th.—During the day numerous enemy aeroplanes attempted to fly over our territory. Hindered by anti-aircraft fire and repulsed by our chasing squadrons, they had to return to their own lines. Only a few machines succeeded in reaching Stazione per la Carnia (Pontebba railway) and dropping bombs, which, however, caused no casualties nor did any damage.

Oct. 19th.—Particular mention must be made of the maritime aerial activity during the day of October 16th in the Upper Adriatic. Groups of mine-sweepers and torpedo-boats having been observed since the morning off the Istrian coast between Trieste and Rowigno, squadrons of our seaplanes proceeded to attack them, compelling them to abandon their operations and to seek refuge in their ports.

We also bombarded the aviation station of Parenzo (midway between Triests and Pola, on the Istrian coast), and an enemy submarine, which was observed to the west of this locality. In the course of numerous encounters with enemy machines, which rose to drive off our attacks, an enemy seaplane was obliged to descend. We sustained no losses.

BULGARIA.

Official Communiqués.

Oct. 18th.—At several points of the front, and notably to the west of Lake Doiran, the artillery activity materially increased. Several hostile aeroplanes dropped bombs unsuccessfully in the district to the north of Lake Doiran."

Oct. 18th.—There was lively aerial activity along the Struma. German aviators brought down in the course of aerial fighting two enemy aeroplanes. One fell behind our position.

U.S.A.

A message from New York on October 18th stated that—

It is reported that Mr. Orville Wright will shortly publish an invention that will revolutionise the manufacture of aeroplanes, and make them so cheap that even a poor man can own one.

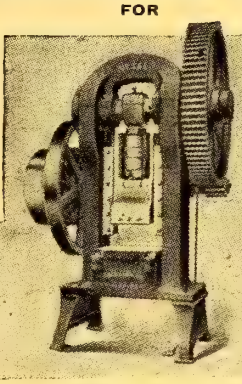
[When Mr. Henry Ford can devise a motor-car which a poor man can own, one will begin to believe in the poor man's aeroplane.—Ed.]

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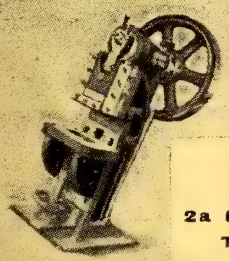
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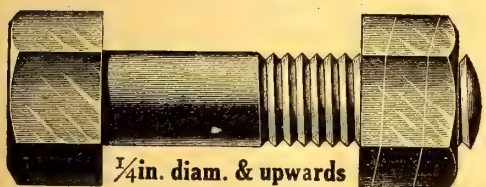
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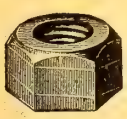
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R.N.A.S. DEMOTIONS.

A matter of routine concerning the R.N.A.S., which has cropped up a good deal of late, seems to deserve the kindly consideration of the higher authorities. There have been a good many instances in which R.N.A.S. officers with quite a good active-service record have been rendered unfit to fly either owing to wounds or to illness incurred on active service. It appears to be the custom, when such officers give up flying, to transfer them to the R.N.V.R. in some capacity or other, and to attach them to the R.N.A.S. where their previous active-service experience is of the very highest value.

But there seems to be just cause for a grievance in that these officers are entered in the R.N.V.R. with the seniority of their date of entry and apparently no account is taken of their seniority in the R.N.A.S. That is to say, a flight lieutenant with seniority of some time in 1914 may easily be appointed to the R.N.V.R. with seniority of some date in 1917 and thus be junior to another R.N.V.R. lieutenant who has had no experience of aviation, and has obtained his R.N.V.R. commission after some three years of profitable civilian life, while the other man was on active service.

Moreover, although the transferred R.N.A.S. officer may be of even greater value in a technical capacity in the R.N.V.R. than ever he was in the R.N.A.S., he only draws the miserable pay of the R.N.V.R., which is a very distinct hardship to one who has done, and still is doing, valuable service to the country.

It is to be hoped that, if and when the Imperial Air Service comes into being, something will be done to ameliorate the lot of officers who have been thus treated.

Another grievance of R.N.V.R. officers transferred from the R.N.A.S. is that if they happen to be quite youngsters no amount of service will get them a second stripe. There is apparently a regulation to the effect that an R.N.V.R. officer must be twenty-three years of age before he can receive a second stripe, and there are numbers of pilots and of active service R.N.V.R. officers under twenty-three who are, in spite of perhaps a couple of years' service experience, junior to men who have been pushed into the R.N.V.R. with two stripes to start with merely because they happen to be lucky enough to be over twenty-three.

Some of these officers have no experience of flying or of the Service, and it would not be very hard to find some who might more properly be called "two-stripe conscripts" than Lieutenants, R.N.V.R. Greater justice would be done if the safe shore-going jobs for R.N.V.R. officers were kept open for broken-down pilots and observers, of whom there are certainly enough to fill most of such jobs.

UNNECESSARY STUNTING.

The following letter has been received:—

Sir,—In reference to a note entitled "Lesson Wanted," in a recent issue, it would be pleasant to think that such performances as are therein related were considered objectionable by the authorities.

About ten days ago at Bournemouth, during a baseball match between Canadian and American teams, an announcement was made by an official "that Mr. —— would now give an exhibition of flying," which this aviator proceeded to do. He came close to the ground and dropped a message on the field and then flew close over the heads of the spectators, who were packed tight on stands. This he continued to do for some time, when he made off, having done nothing either interesting or skilful, merely, however, endangering the lives of the crowd and risking his own machine.

The next day being Sunday, at midday Church Parade, the same machine (apparently) appeared again. It is impossible to say whether it was the same aviator, but by the behaviour of the machine it looked much like it.

The pilot flew up and down the sands, sometimes not 20 feet from the ground, turning over the crowded pier and repeating this performance for some time—waving his hand to friends on the parade. If his engine had failed, nothing could have saved his machine—high cliffs on one side and sea on the other would have made a disastrous landing place.

It is impossible to believe that such performances can have escaped the notice or cognizance of the authorities. Bournemouth, however, seems to be completely out of hand as regards military control. Crowds of officers, of the store-keeper type, are allowed to wear any kind of coloured ties or collars, and to joy-ride up and down the parade in motor-cars.

It is all very distressing to very many people who cannot appreciate either cheap or dangerous swagger.

(Signed) "X."

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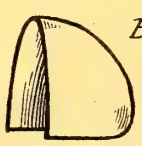
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THE LATE MAJOR VALENTINE, D.S.O., R.F.C.

A belated message from Russia states that the late Major James Valentine, who in Russia bore the rank of Lieut.-Col., had been recommended by the then Commander-in-Chief of the Russian Army for the Cross of St. George or the Fourth Degree for exceptional bravery. Major Valentine had already received the British D.S.O. and the French Legion of Honour, so that his mother and widow have at any rate the consolation of knowing that Major Valentine had received marks of the greatest esteem from the people in the highest position in three of the Allied nations.

AIR RAID WARNINGS.

On Oct. 18th, Sir G. Cave, answering a question by Mr. Gilbert (Newington, W., L.) on this subject, said: I recognise the necessity of giving warning in London when a night air raid is impending. I am informed that on the occasion of the recent raids, thanks to the warnings given by the police and to the sound of the anti-aircraft artillery (which was heard some time before the arrival of the raiders), London as a whole received effective warning; but the system of police warnings is being daily improved and extended, and every effort will be made to secure that the warning shall be as effective as possible. I am advised that the sound bombs, which were instituted for the purpose of giving warning by day, are not suitable for use at night; but if it should prove impossible to give an effective warning without the use of these bombs they will be used.

Mr. Gilbert: Has the attention of the right hon. gentleman been drawn to the action of the Bermondsey Borough Council, who exhibited blue and red lights on public buildings to show whether raiders were coming or not, and, if this had his approval, would he advise other local authorities to do the same thing?

Sir G. Cave: If any local authority thinks any supplementary warnings of that kind are useful, there is not the least objection to their using them; but I hope they will not use them until definite notice is given, so as to avoid needless alarm.

Sir C. Kinlock-Cooke (Devonport, U.): Has there been any change in the "All clear" signal?

Sir G. Cave: I understand the "All clear" signal is to be given by bugle. [Another terror added to existence.—Ed.]

* * *

In Walthamstow it has been decided that a "take cover" warning shall only be given between 5 p.m. and 6 a.m., and that the signal is to be three blasts on a steam siren with a few seconds' interval between them. There is to be no "take cover" warning by this means in the day time. Both by day and night however, there will be an "all clear" warning, consisting o one long blast on the siren.

EAST ISLINGTON.

From the "Daily Express" of October 18th:—

The air candidate for East Islington is Mr. Alfred Baker, th town clerk of Hertford, who during the past year has been firm supporter of Mr. Pemberton-Billing, M.P. He will make hi first appearance at a meeting this evening. Mr. Pemberton-Bil ling explained at a crowded meeting last night that Mr. Bake was unable to attend because he had some tribunal work to clea up.

The large audience at last night's gathering was compose almost entirely of workers, who enthusiastically applauded M Billing's advocacy of the immediate and relentless bombing German towns.

On the platform beside Mr. Billing was Lt. W. A. C. Allen R.F.C., and Mr. Billing stated that but for a discovery at th last moment on the previous night Lt. Allen would have bee brought forward as the candidate. He explained that Lt. Alle was a clergyman, who enlisted as a private at the beginning the war. He was prepared to stand as candidate, but a frien warned them that the Government intended, if Lt. Allen wer elected, to secure his disqualification on the ground that he sti remained a clergyman.

"It is possible," said Mr. Pemberton-Billing, "for this cou try to win the war in the air. If you don't vote at this electio you are playing the German game. I told Mile End in January 1915, that German aeroplanes would bomb London, and I wa laughed at as the 'bogey man.' I urged a great air offensiv then because I thought that if it was good enough for the Ge mans to devastate London with high explosive bombs it wa good enough for us to reduce Berlin to ruins. Let East Islingto help to rain explosives on the outcasts of the world."

Mr. Alfred Baker is not only town clerk of Hertford, but one of the chief solicitors in the town, has twice been mayor, an is clerk to the local tribunal.

Before the war he was an ardent Unionist, and years ago h acted as Mr. Balfour's election agent, when the present Foreig Secretary sat for the constituency which Mr. Pemberton-Billin now represents.

[This paper has to go to press before the result of the electio is declared.—Ed.]

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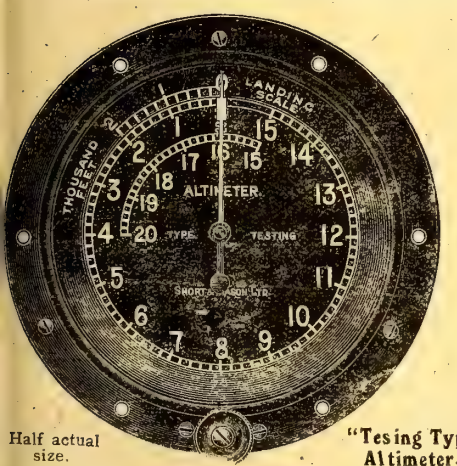
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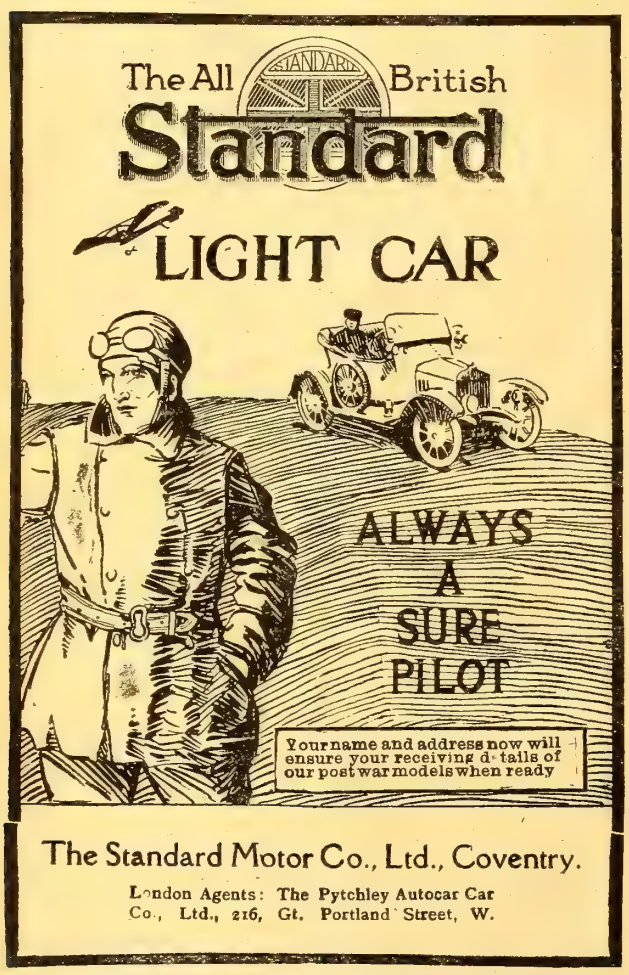
A NECESSARY ACTION.

At Bow Street Police Court, on October 19th, before Mr. Garrett, Ethel Quinlan, aged 28, a clerk in the offices of the Air Board at the Hotel Cecil, Strand, W.C., was remanded on a charge, to which she pleaded guilty, of stealing a £1 Treasury note from the handbag of a woman assistant supervisor in the same establishment.

It was stated that the authorities attached importance to the prosecution, inasmuch as at the Air Board headquarters, where between 2,000 and 3,000 women and girls were employed, larcenies of this kind had been going on for some time at the rate of six or seven a day.

AERIAL PHOTOGRAPHY.

The Royal Photographic Society of Great Britain has changed its usual procedure by holding its annual exhibition at its own premises, 35, Russell Square, W.C., instead of at one of the art galleries, and is inviting the public to view the photographs free of charge. The exhibition will be open daily (Sundays excepted) from 11 a.m. till 9 p.m., and lantern lectures on popular and interesting topics will be delivered each Tuesday and Friday evening from 8 till 9.



Photographs lent by the R.F.C. show positions held by the enemy and, as the photographs made by flying officers have been taken at intervals, the obliterations of the natural features of the country under heavy gun fire are remarkably clear.

Another series shows our own men drawn up for attack. Large detachments of aeroplanes guard the troops from the enemy's flying machines.

A REWARD OFFERED.

It is reported that Mr. W. H. Veno, Chairman of the Column Club, Manchester, offered £1,000 to the British aviator who drops the first bomb on Berlin. One bomb dropped on Berlin, he says, would have more military and political effect than hundreds dropped on the Rhine towns. Later he discovered that officers are now forbidden by Regulations to accept tips, so he varied his offer by making the sum payable to a charity.

[How much longer will it take the British merchant class to learn that the British officer and gentleman does not accept bribes for the proper performance of his duty and that it is an insult to offer him a monetary reward for the accomplishment of ordinary military routine.—Ed.]

A U.S. CUSTOMS DISPUTE.

A New York Customs dispute has revealed the exportation to New York of the remains of a Zeppelin shot down during one of the London air raids. No reason is assigned for the shipment, but considerable doubt seems to exist as to how the relics should be classified for tariff purposes.

The U.S. tariff law makes no classification of airships, but under a ruling of the Treasury Department airships and aeroplanes may be entered free under bonds for racing. The customs examiner reported that the Zeppelin, in the form in which it reached New York, appeared to be composed almost wholly of steel and aluminium, and recommended that duty be taken at 20 per cent., ad valorem, as a manufacture of metal "not specially provided for."

The importer, whose identity is not revealed, set up the claim that the wreckage should be admitted at 2 cents a pound as "aluminium scrap," with an alternative claim at 3½ cents a pound as "aluminium in bars, strips, rods, etc." As no agreement was reached, the importer paid the duty demanded and will submit testimony to the Board of General Appraisers.



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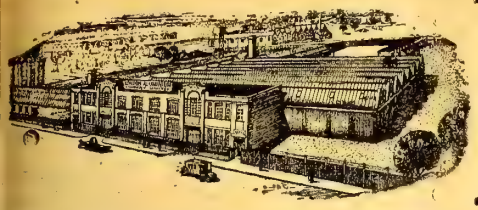
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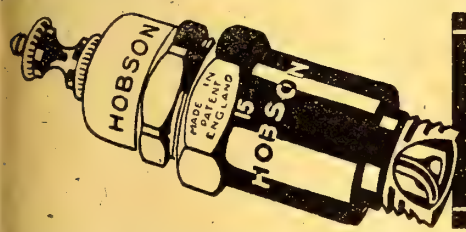
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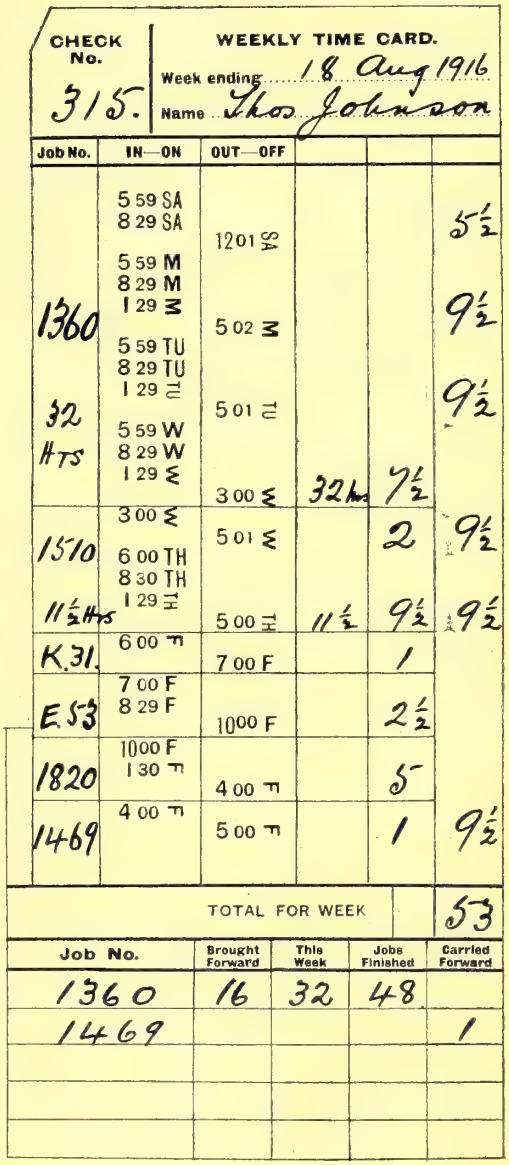
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	1 29 W	3 00 W	32 hrs	7½	
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E.53	7 00 F 8 29 F	10 00 F		2½	
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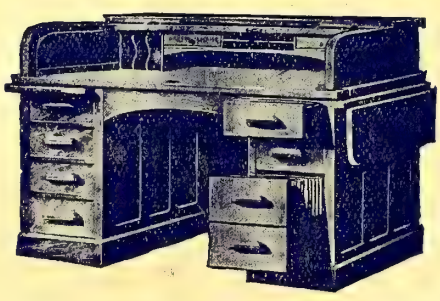
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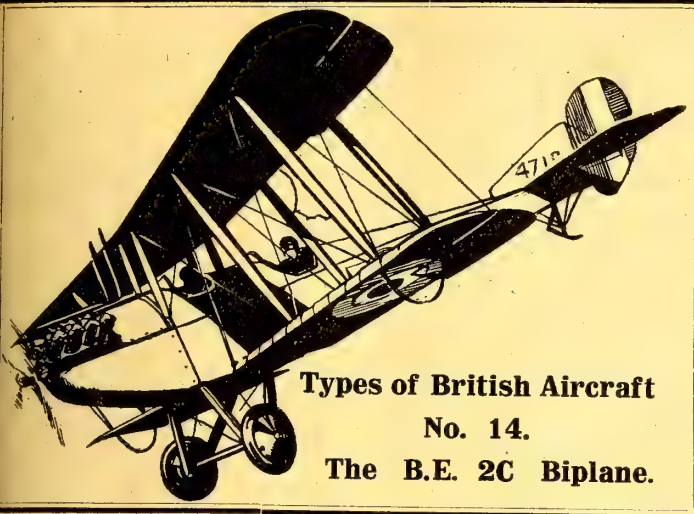
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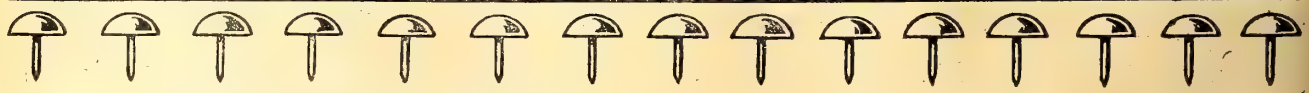
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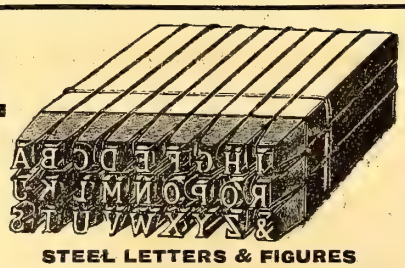


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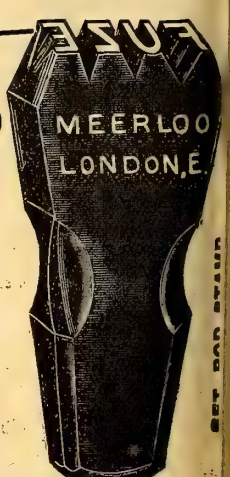


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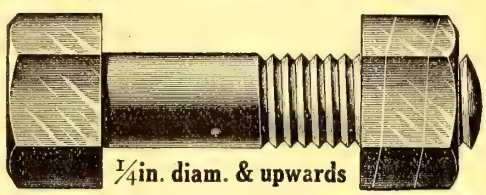
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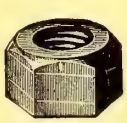
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ON MORE AND MORE AND STILL MORE—III.

Chasers.

On the subject of increased output generally, there is a side-issue which might bear a little investigation, that is the matter of chasing up deliveries. I believe the polite title for the official who would in ordinary business be called a "chaser" is "production officer," but chaser is a shorter word and may just as well be used for purposes of argument.

Naturally it is not good for the *moral* of a factory to have partly finished machines standing around waiting for this, that, or the other fitting; the men who worked on a machine which has been standing idle for weeks are apt to regard their work as wasted and to lose their enthusiasm in consequence. Also the machine takes up floor space and prevents the erection of others, and so stops the progress of other work through the shops. Therefore it is good to have chasers running around to find out why machines are held up and to hustle them through.

But there are chasers and chasers: some are very good and some are not. Some concern themselves mightily with getting the necessary fittings and are of the very greatest assistance in the factories with which they co-operate. Others, it seems, find it easier to get permission to dispatch incomplete machines somewhere or other, but anywhere so long as they get out of the shop and increase output on paper, regardless of whether machines so put out are usable or not. Such operations may result in good aeroplanes going out without engines, or in good engines going out in aeroplanes of inferior value.

Others, one is told, take it upon themselves to reorganise factories at five minutes' notice, so to speak, without full knowledge of the circumstances of the individual shop and so succeed in upsetting the managers without increasing output at all.

On the whole the official chasers are doing good work, but some few will do well, in their own interests as well as in the interests of the greater necessary output, to which Lord Cowdray referred recently, to remember that an incomplete aeroplane hustled out of a shop does not increase the effectiveness of the R.F.C. on active service. It may look well in a report to see that such and such an official has chased the output of such and such a factory to a matter of 200 per cent. above what its weekly value in cash was before he was appointed, but if that cash-value output is composed largely of unusable machines his work and the work of the factory has been largely wasted. It occurs to one that a return of flyable machines sent out would be more valuable than a return of total output.

Faults in Workshops.

Let it be clearly understood that all the faults, or even most of the faults, which delay output are not to be attributed to Government officials. The actual makers of machines, from manager to shop boy, are equally to blame. The men themselves, or the best of them, know it too well.

Only the other day a workman wrote to me, chiefly concerning an invention, but adding: "How many big shops in this country are employing men in charge of the work who are purposely holding the work back because they are better remunerated for this than they are for getting it out honestly and quickly. I travel about a great deal, and I observe that England is not fighting against Germany so much as she is against England. Ignorance, incompetence, and treachery, with a goodly share of avarice, is what England is fighting. As for the aeroplane shops, they want to be thoroughly gone through with a business broom and disinfected afterwards."

This correspondent states his case strongly, but he is not far wide of the mark. The workman in his ignorance refuses to be educated up to increased output, with increased wages to correspond. His incompetence, owing to the disuse of the excellent old-fashioned system of apprenticeship, lowers his output per man. His treachery to his own class prevents him from trusting the more enlightened workmen who want him to educate himself and increase his output. And his avarice leads him to strike for wages which he could never be worth, even when the strike imperils the safety of the country, including himself and his family.

Rather than work harder to produce more aeroplanes and so prevent raiders from ever reaching this country, he will condemn his wife and his miserable brats to stew in the foulness of a tube station throughout the night, and then he strikes for pay for the hours during which his shop was shut down owing to the raid which he might have helped to prevent.

The British Workman—by Himself.

Another workman writes: "The German output is governed by rigid working laws, with no redress to the worker, whilst in our factories much time is wasted by the majority of the workpeople in talking and chatting and remarking. When the British workpeople overcome the tendency, in fact the national evil, of gossip and chat, and *get on with their work*, then our output will speed up. I have lived in the United States considerably, and I know that workmen on urgent work discuss general matters *after* work, and follow up orders only *during* work. Silence will surely assist to win the war in many spheres of action."

There is another man who knows his fellow-workers. And yet we hear of meetings of "shop-stewards" during working hours, meetings in the employer's time, at which strikes are planned, and the people at those meetings insist on being paid for the time thus disloyally spent.

It is not the old, highly skilled, well-trained men who raise the trouble. It is the young, able-bodied fellows who, if we had had the sense to put conscription into force when war broke out, would now be in the Army and would have been hammered into becoming men.

The Source of all Trouble.

You can see them by the thousand coming out of any factory—aeroplane or other sort—at the dinner-hour. Well dressed in a cheap, flashy way. Long hair brushed well back, and often without hats. "Fags" hanging out of the corners of their mouths. In fact the "dead spit and image"—as they say in Ireland—of the Conscientious Objectors at Dartmoor, who provide so much amusement for the cheaper picture-papers when there are no German corpses nor *crimes passionels* to illustrate. Only these fellows have not—forgive me, my feminine readers—have not the guts to be Conscientious Objectors. They have not even that much of the spirit of the martyrs in them. They are merely trench-dodgers.

After a few months in munition works they pose as skilled workmen, whereas a year after war began they were sanding the sugar in a grocer's shop or doing something equally honest and intellectual. And meanwhile the old fathers of families who stuck honestly to the jobs they had held for years, or tried to hold together the little one-man businesses on which they were depending for their comfort in their old age, are dragged off into the Army to fight for scum like these.

Well, perhaps after all the Army is better without them, but in the meantime they are the people who are doing as much as anybody to hold up the output of the aeroplanes which are so urgently needed to win the war. Let us hope that when the Army comes back, and when munition factories shut down, and when these trench-dodgers find themselves out of work, the Army and its friends will give them something of what they deserve.

Piece-work.

One of their tricks is to bar piece-work in aircraft factories, on the "patriotic" grounds that piece-work means bad work, and so means endangering the lives of our aviators. A lot they care, forsooth! What the bar means is that the whole shop can set its pace as slowly as it likes, and strike for more money whenever it thinks there is a chance of squeezing out a bit more.

A friend of mine, who runs rather a small shop, got over this difficulty rather neatly not long ago. He sacked two men who were obvious slackers, and the whole shop went on strike in sympathy. So he called them all together and said: "Very well! Get back to work. But just to encourage you I'll make a bargain. You won't have piece-work, nor will I. Your rate of pay is a flat shilling an hour all over the shop. Your output is £1,000 a week for the whole shop. When the shop output touches £1,250 in a week the flat rate will be 1s. 3d. an hour. When it touches £1,500 the rate will be 1s. 6d. an hour, and so on. I don't care a hang if you make 2s. 6d. an hour so long as I get the output."

The result was that at the end of the first week they just missed the 1s. 3d.—as he showed them by his invoices—and half-way through the second week the foreman of the shop came and told him that the other chaps wanted the two slackers—on whose account they had previously gone on strike—sacked at once and replaced by two others, because they were hanging up the shop output. When last heard of the shop was going strong and the flat rate was 1s. 6d. an hour. Which shows you just how far the British workman's loyalty to pal or employer or King or Country really goes.

It is purely a matter of either making it worth his while to work or else of putting the whole population under military law. And I am ready to bet that none will agree with me on the subject of the British workman of to-day more closely than will British workmen of the previous generation, who, when they were serving their time, got a clip in the ear or a toe in the trousers from their foreman whenever he caught them slacking. To-day, of course, with our pampered trench-dodgers, any foreman who acted so would promptly be prosecuted for assault.

The fault is not all the workman's. It is largely our soft-handed, mealy-mouthed, undisciplined system of education which is to be blamed. Also the absence of conscription before the war. Also the avarice and crookedness of gangers, foremen, and managers. Also the desire of employers to get rich quick at the workman's expense. Also the foolishness of Government officials. Also the imbecility of our various Governments. Also the super-imbecility of the people who elected the politicians who appointed the Governments. And so we come back at the finish to the fact that it is we ourselves who are to blame. So the sooner we try to improve ourselves the better.

A.I.D.

Another place where reforms are necessary, if we are to have those more and more and still more aeroplanes which are so urgently needed, is in the Aeronautical Inspection Department. Undoubtedly the people at the head of the department are earnestly desirous of increasing output, and are doing their best to combine accuracy of work, reliability of material, and enormous production. But it is questionable whether they are going the right way to work about it, or whether they put the three factors of workmanship, material, and production in the right order of importance in their own minds.

Reliability, or high quality, of material is undoubtedly the most important of the three, for on it depends the lives of all who fly, and on their remaining alive depends the whole work of the Flying Services. Quantity-production is surely the next most important factor, for without quantity of aircraft the Flying Services will simply be overwhelmed by the number of the enemy's machines. Workmanship, important though it may be, in assuring the reliability of an aeroplane and its engine, is surely the least important of the three. Yet the A.I.D. seems to place workmanship before everything else, with the result that good material is scrapped after all the work has been done on it, and quantity-production is held up, just because some piece of work which is of no real importance to the effectiveness of the machine does not come up to the academic standard of perfection imposed by the A.I.D.

Spit and Polish.

Many of the older readers of this paper will remember the little fracas between Lord Charles Beresford, as he then was, and Sir Percy Scott, when the former, as senior officer, made a signal to the latter ordering him to stop certain gunnery practice which was being carried on by ships under his command, and to recall the ships for a cleaning up preparatory to taking part in some review or other, or to act as escort to some foreign potentate—I forget which. Anyhow, Sir Percy Scott, to whom gunnery was the be-all and end-all of existence, passed the order on to his ships and made a supplementary signal on his own account—"Spit and polish is apparently more important than gunnery." I think that those were the exact words of the signal, but anyhow the jeer at his senior officer as to the relative values of "spit and polish" and "gunnery" was the *casus belli* between the two.

Naturally Sir Percy Scott was guilty of insubordination in sending such a signal, but in essence he was

right. Spit and polish, which includes routine work, can be carried too far, and that is what is chiefly the matter with the A.I.D. "Spit and polish," or their workshop equivalents, which are needlessly good finish and needlessly fine limits, are considered to be more important than "gunnery," which means the output of aeroplanes and engines which are necessary to get our machine-gunners and bombers into the air over Hunland and over Germany.

Not only are the actual limits themselves needlessly fine in many parts where fine work is merely waste of time, but the methods of the people employed are frequently a cause of more delay and decreased output. As witness a letter which appeared in the "Daily Mail" of October 25th, and reads thusly :—

> Sir,—It seems almost incredible that now, when England is practically starving for aeroplanes, manufacturers of these machines should be so hampered by red tape and officialism.
>
> I am interested in a small firm (the employees do not number forty, including the clerical staff), but there are three resident officials. Their method of procedure is as follows :—
>
> A spar having been produced from the mill, the junior inspector walks round it, rule in hand, hoping to find some serious defect. Disappointed, he continues to walk round it for about two hours, and then discovers some trivial flaw, round which he draws a red-pencil line, and proceeds to report his discovery to the resident chief, who now appears on the scene.
>
> They consult together for another half an hour, when the foreman (who is waiting for the spar) asks if they have passed it, and is told they cannot take it upon themselves to do so, but must report it to their chief at headquarters.
>
> After three days this official arrives, bringing with him a wood expert, and the four proceed to hold a sort of coroner's inquest on the spar for another half hour. The foreman then asks if it has been passed or condemned, and is told that *they* cannot take the responsibility of passing it, but will bring down Lieut. ——— to see it.
>
> After a few more days the lieutenant (who is a man who thoroughly understands aircraft) arrives, gives a general look at the article, and says, "It is quite all right."
>
> Result: Work held up for ten days because the inspectors sent to the firm know absolutely nothing about timber or aircraft; any man who understood the business could have settled the matter in five minutes.
>
> Inspectors are recruited from all sorts and conditions of men—engineers, draughtsmen, out-of-work actors, mining experts, journeymen carpenters, and mathematicians, but I have never met one who was capable of saying what was right or what was wrong, and had the courage of his opinions. UTTERLY DISGUSTED.

A Significant Fact.

The fact that such a letter should have appeared in a daily paper is in itself hopeful, for it indicates that as a nation we are reverting to our original business as producers, on which our national greatness was built up, and are becoming somewhat less a nation of shopkeepers. And the millions of people now working in factories who before the war were serving behind counters, or in some other non-productive walk of life, will be all to the good when it comes to reconstructing the empire's finances after the war.

In the meantime these millions of producers, some hundreds of thousands of whom are now employed in the Aircraft Industry, must be organised so as to give the maximum production. And the A.I.D. methods are not operating so as to give that maximum production. The letter quoted above merely displays in graphic, if slightly exaggerated, form complaints which reach me by the dozen.

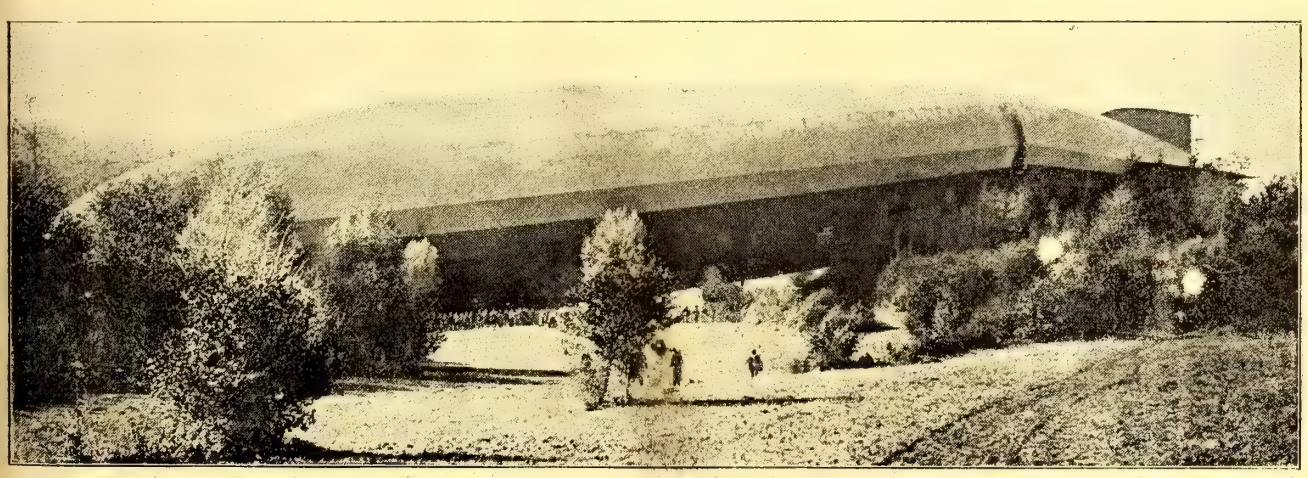
The subject has been discussed over and over again in this paper. From time to time there have been improvements in A.I.D. methods in some directions, but there have always been relapses in other directions. The chief trouble, which seems to be the root of all evil, is that the organisation and routine methods appear to be based on the scheme of a scientific laboratory rather than on those of a commercial producing firm.

A Difficult Task.

One quite sympathises with those at the top of the A.I.D. organisation. They have the greatest difficulty in finding men capable of acting as viewers, examiners, and inspectors, and so sometimes it has been necessary to evolve something like a cast-iron system of inspection which can be carried out by anybody who is better equipped mentally than a congenital idiot. When one comes across A.I.D. officials who were before the war local hairdressers or bakers' van-men, in addition to the heterogeneous collection of trades mentioned in the letter quoted, one naturally understands that such people cannot be given latitude to use their personal judgment on matters of either material or workmanship.

Some may ask why A.I.D. officials are not chosen exclusively from among men with actual engineering workshop experience? The answer is very simply that the pay allowed to the A.I.D. by a parsimonious Treasury, which in other directions permits itself to be robbed wholesale by 'cute business men, is so meagre that any workman or engineer worth his salt can earn at least twice as much at the bench or as a producer in some other capacity. Consequently the really good men in the A.I.D. are only there from purely patriotic motives, some of them at great personal loss.

Unfortunately the supply of such high-souled patriots has its limits, and even so it is diminished by the fact that many really patriotic men know that they can serve their King and country better as producers than as critics of produced articles. And so one finds among the A.I.D. people some who are only there because



One of the Friday Night Zeppelins, which descended in France, and was reported "captured intact." The badly buckled state of the tail-end may be noted. The ship is painted a pale colour on top and black below. The white ground is the effect of sunlight, not of snow, or one might take the light top of the ship for a snow-fall after its descent.

they are no use anywhere else, and precious little use where they are.

An Example of Methods.

The faults of, and the delays caused by, the A.I.D. are by no means confined to these unfortunately ignorant minor officials. Quite as much harm is done by those in higher positions who evolve the fungus-like, ever-growing procedure of the Department, which is rapidly succeeding in subordinating the real work of its officials to the task of filling in multitudinous forms. An example of the work done by some of these gentlemen may illustrate the statement.

At a certain important engine factory some thousands of man-hours were used up, over a period of nine months or so, in manufacturing packing-boxes for engines. The contract was eventually washed out and the boxes were ordered to be delivered to stores in London—some hundred miles or so away—packed flat in bundles of ends, bottoms, tops, and sides, with the tin linings ripped out and also packed flat.

Previously each of those boxes, over a thousand in number, had been assembled into complete form, and the A.I.D. had ordered that each bottom, each side, each top, each end, and, above all, each bit of tinker's iron-work, forming a humble component of each case, should be gravely inspected, and if in strict conformity with A.I.D. drawings and specifications solemnly stamped with the A.I.D. stamp.

Surely the provision of packing cases could have been left to the common sense of the manufacturers of the engines without wasting Government draughtsmen and tracers and printers and inspectors on such work. A plainly worded specification saying what was necessary outside the case, in the way of runners or cleats or hooks for transport purposes, would have been quite enough. And anyhow, why build hundreds of cases before an engine has been produced satisfactorily?

Then and Now.

In the time of the never-sufficiently-to-be-lamented Colonel Fulton the A.I.D. was the brightest spot in the whole organisation of the R.F.C. To-day it is rapidly becoming a danger to our rate of production.

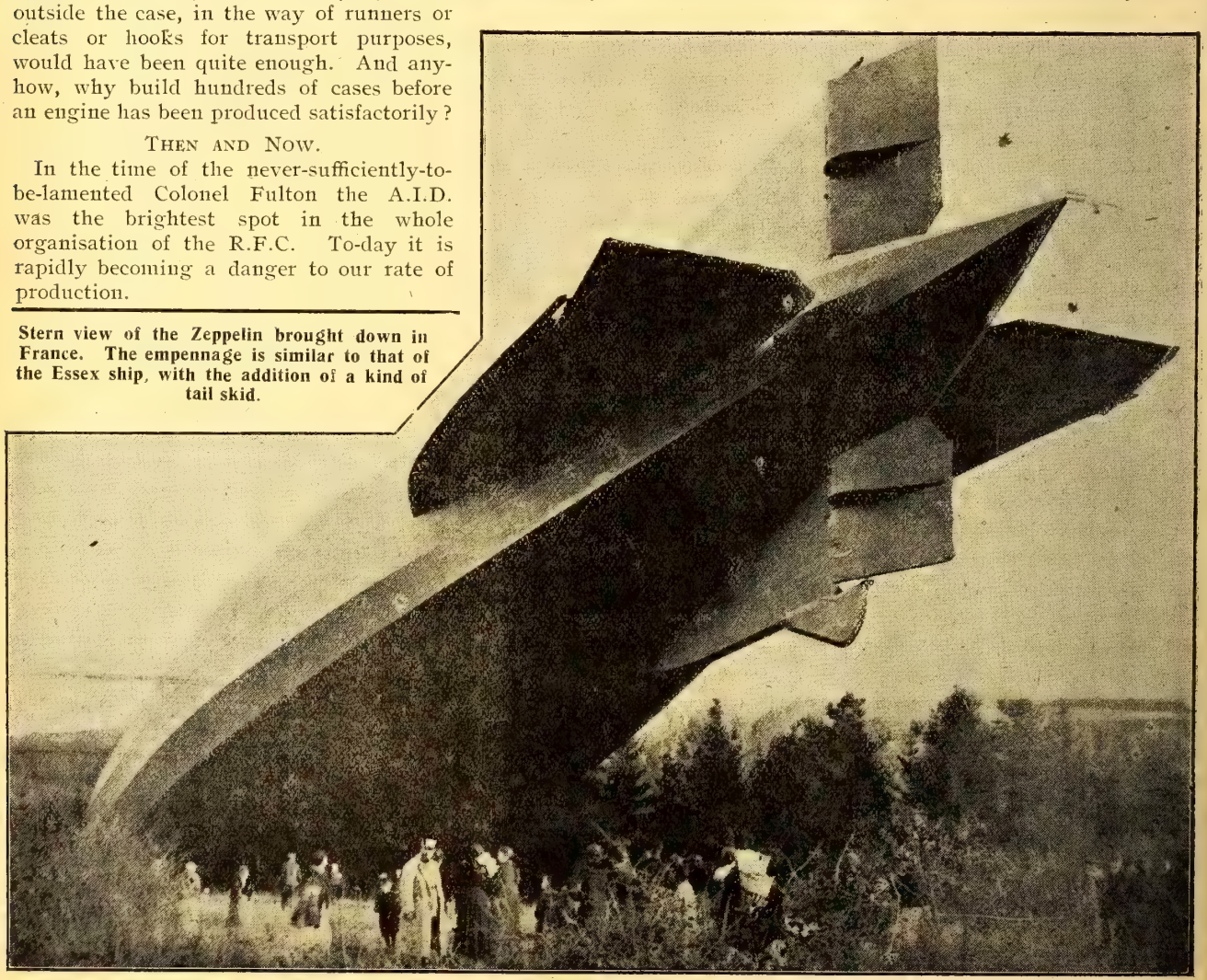
In those days it was a definite instruction to all officials that the duty of a viewer, examiner, or inspector was to pass stuff for service, not to hold it up for trivial details or for the sake of paper procedure. To-day it is a definite instruction that procedure must be followed.

Apparently the only paper which must not be filled up is anything in the way of a communication to the Press. Which, of course, is a very right and proper injunction in any Government Department. Only the fact that it should now be considered necessary for the A.I.D. to issue such an injunction seems to indicate a consciousness that something is wrong internally which is likely to break out in that particular direction.

As a matter of fact such an order is quite unnecessary, for the people who suffer, and who are therefore likely to commit the crime of communicating with the Press, are not the A.I.D. officials, but the victims of officialdom, the manufacturers, managers, foremen, and the intelligent and patriotic workmen who see their work delayed or wasted through official acts. These people know as much about A.I.D. procedure as A.I.D. officials, and frequently have to explain to the A.I.D. people what their voluminous orders from headquarters are intended to mean, so that A.I.D. instructions are no State secret.

The Remedy.

The remedy for all these troubles seems to be to decrease rather than increase the amount of inspection. Put the burden of examination more on the manufacturer. He must in any case have his own staff of examiners who, to a very great extent, merely duplicate the work of the A.I.D. Have fewer A.I.D. officials, pay them better, and so secure first-class men only. Let



Stern view of the Zeppelin brought down in France. The empennage is similar to that of the Essex ship, with the addition of a kind of tail skid.

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them inspect the finished product and leave the rest to the man who made the stuff. A manufacturer who has a finished engine or a complete aeroplane thrown back at him will be mighty careful afterwards that all his detail work is right.

Our Beautiful System.

The difficulties in the way of reducing the size of any Government department are great, for the importance of the officials in that department depends on the net size of the department rather than on its efficiency. Also the whole departmental system is wrong.

For example, although a clever minor official may find that, with the aid of one thoroughly competent typist at £3 a week or so, he can increase his output of work two-fold, he cannot have such a typist because the official pay for a typist is not so high. Therefore he applies for half a dozen junior assistants at £1 a week or so, and gets them without a murmur. Then he applies for an assistant to control these junior typists, and gets the typist for whom he applied originally, and is able to pay him or her £3 a week, as an assistant and not as a typist. The two of them do all the work, the other six are chiefly an encumbrance, and the office costs £9 a week extra, instead of three.

Then he realises the possibilities of the scheme, applies for a whole lot more junior assistants, and, because he has so many underlings, gets himself appointed Deputy-Sub-Assistant-Controller of something or other. The net result is an increase in pay for himself and a lot of useless hands about the place. And so it comes about that the less efficient an office may be, the greater are the number of people in it, and the higher the rank or grading of the head of the department.

If it happens to be an office which carries a military title with it and employs a couple of hundred hands highly efficiently, the chief is probably merely a captain. If it is so inefficient as to need a thousand underlings or so, the chief must be a colonel. And if he is clever enough to make it so inefficient or so cumbersome in organisation as to need three or four thousand employees to do the work which five or six hundred really efficient people could do, the chances are that he will become a brigadier-general.

This, of course, does not apply to the regular Army, which, taking it all round, is extraordinarily efficient. Nor to the R.F.C., which, despite its youth and all its vicissitudes, has a very effective system of organisation and is improving daily. Nor do I wish it to be applied specifically to the A.I.D., the heads of which are doing their level best. I merely give it as an example of the direction in which our departmental system leads, so that the hard-working and honest people at the top may look down through their various departments and discover for themselves whether some of their subordinates are or are not wilfully padding out the work of their sub-departments and producing more and more procedure and more and more underlings with a view to their own promotion, instead of devoting themselves heart and soul to producing more and more and still more aeroplanes with a view to winning the war.

A Biological Benefit.

Of course, none doubts for a moment the earnestness or the excellent intentions of the chiefs of the A.I.D. departments. Their real trouble seems to be that their intentions are too excellent. In this human world perfection is unattainable, and, though the desire to obtain perfection is entirely praiseworthy, the insistence on too near an approach to perfection may have precisely the opposite effect to that desired, *videlicet* the fact that the sons and daughters of the clergy average in their after life a lower moral standard than the children of less perfect parents.

Some humorist suggested the other day that as war is a biological necessity, and as the purpose of this war is ultimately to improve the human race, a good start in the direction of improvement might be made by executing—entirely without prejudice—about half the Headquarters Staff of the A.I.D. The reason given by the propounder of this extraordinary proposal is that, owing to their high-souled yearning for perfection, the souls of those thus executed would inevitably go to Heaven, where, owing to their experience in organising a perfect system of inspection, they would certainly be made the nucleus of a Celestial Inspection Department, the duties of which would be the inspection and passing of new souls about to begin their earthly existence. With their aid the next generation of human beings would then be so much better than the present generation that in time to come wars, political grafts, commercial swindles, and so forth would cease, and there would not even be a need for an A.I.D. on Earth. But perhaps this also is a counsel of perfection.—C. G. G.

THE FIRST AIR MINISTER.

It is now stated in well-informed circles that the First Air Minister is to be Lieut.-General Sir David Henderson, K.C.B., D.S.O. Undoubtedly in answering questions in Parliament he should be a great success.

THE IMPERIAL AIR SERVICE.

Meeting under the presidency of Mr. Joynson-Hicks, on Oct. 25th, the executive of the Parliamentary Air Committee listened to a statement by Lord Montagu of Beaulieu, embodying the results of his journey to the Allied countries, and passed a resolution respectfully urging the Government to introduce, without further delay, their bill for an Imperial Air Service.

THE TURIN-LONDON FLIGHT.

At Hounslow aerodrome on Oct. 25th the Italian Ambassador, H.E. the Marquis Imperiali, presented, on behalf of the Italian Government, to Lord Cowdray, as President of the Air Board, the two-seater aeroplane in which Captain Laureati recently made his non-stop flight from Turin to London, a distance of 670 miles in 7 hours 22 minutes. Among those present were Lord and Lady Cowdray, Lady Ethel Baird, Admiral Mark Kerr, General Longcroft (representing Major-General Salmond, Director-General of Military Aeronautics), Baron Mayor des Planches (Italian High Commissioner in London), Captain Laureati, and Captain Croce.

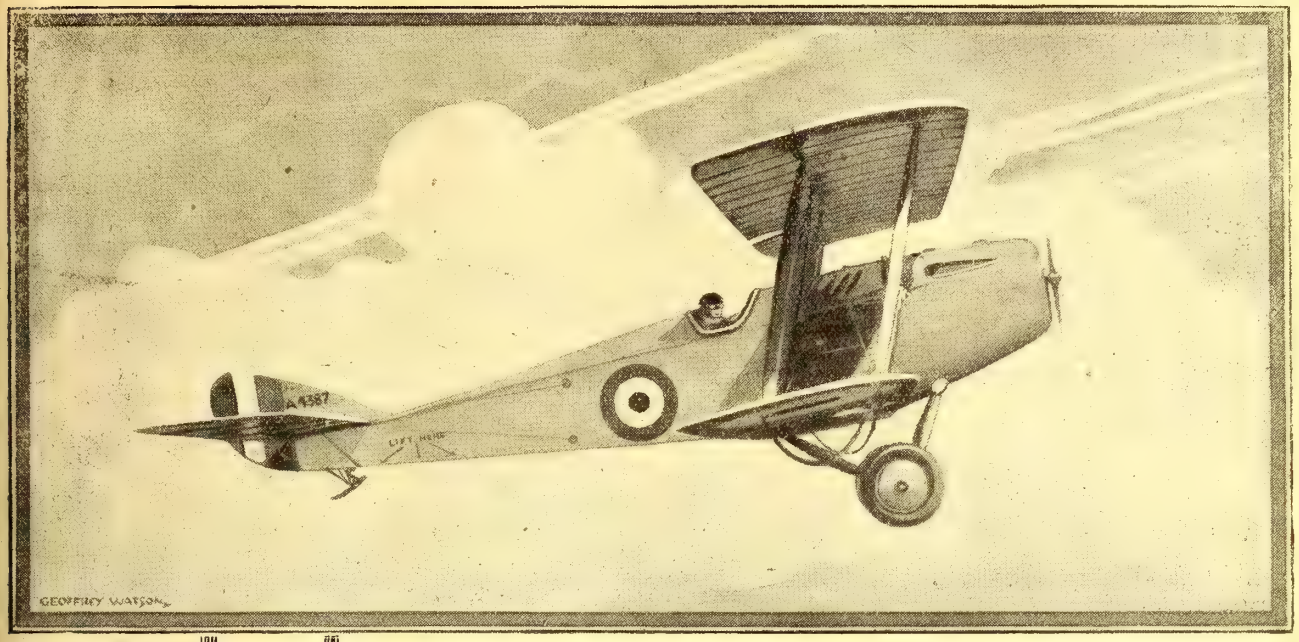
The Italian Ambassador, in making the presentation, said that Captain Laureati's flight would remain memorable. To the Italian people it stood as a symbol. It revealed the possibilities of direct communication across space between two nations who long since had been traditional friends. The present alliance, indeed, by the successful efforts of the two countries for the common cause, has only given a more tangible form to, and rendered more clearly evident, this everlasting friendship. The Italian Government desired that the aeroplane in which that first flight from their land to ours was accomplished should remain to Great Britain as a grateful testimony of Italy's desire to be joined ever closer to her mighty friend and Ally.

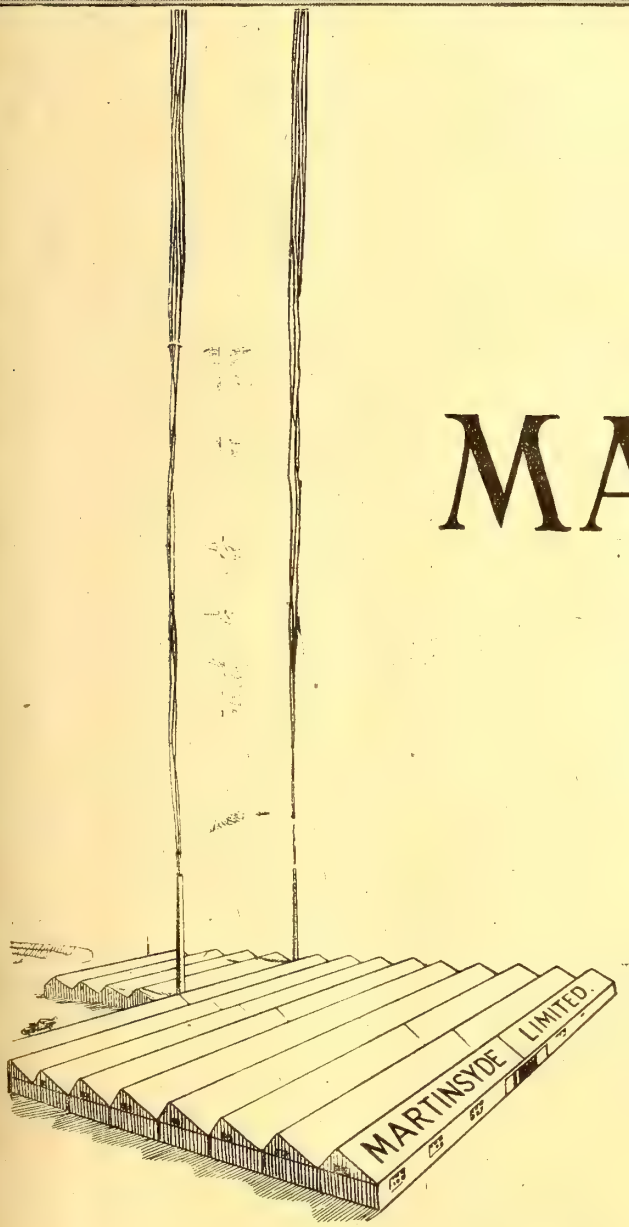
"In the name of the Italian Government," he concluded, "I have the honour of presenting to his Majesty's Government, in the person of your lordship, this aeroplane—'S.I.A., two-seater, reconnaissance, type 7-B.1. No. 5870'—which bears the beloved name of 'Italia.' I trust it may be accepted with those feelings of sincere friendship with which it is offered."

Lord Cowdray, in accepting the gift, expressed profound admiration for Captain Laureati's magnificent performance, in which, he said, "we recognise a token of that native genius and enduring vigour which have enabled the Italian people for so many centuries of the world's history to contribute potently to the progress of civilisation and to the enrichment of the human spirit." In expressing his appreciation of the sentiment of long-standing friendship between the two nations which had prompted the gift, he said: "I am certain that the sentiment will, if possible, be strengthened and deepened by the consciousness of the efforts and sacrifices which the two nations are making in common. This magnificient machine, which is being presented by the King of Italy, will be treasured, I hope everlastingly, by the British nation."

Lady Cowdray then christened the gift, by breaking a bottle of champagne on the "nose" of the machine.

Captain Croce, the Italian aviator, who recently flew a single-seater aeroplane from Italy to London, gave an interesting display in a heavy storm of rain.







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KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

ON THE PROPER MOMENT.

Some few weeks ago certain Cabinet Ministers promised that we should "at the proper moment" start dropping bombs on Germany—by way of reprisals for raids on the south-east of England and London. The hope was then expressed in this paper that when the Government considered that the proper moment had arrived the job would be done properly and not in penny numbers—or words to that effect.

Judging by the official communiqué published on October 26th, it would appear that the Government has weakly given way to popular clamour for "reprisals at once," instead of leaving it to those most qualified by experience to judge whether the proper moment had arrived. The communiqué states that on the night of October 24th "3½ tons of explosives were dropped on the Burbach Works, west of Saarbrücken, by naval machines," and says further, "A total of five tons of explosives were dropped by us. The enemy's anti-aircraft defences were strong. At first the weather conditions were good, but later they became very bad, with rain, low clouds, and a strong wind rendering the return of our machines most difficult."

Politics.

It is deeply to be regretted if purely political motives have led to what seems immature activities taking place at what was obviously not the proper moment. One would have hoped that the naval and military authorities concerned with and for the Flying Services would have had sufficient strength to resist political pressure of such a kind. Every credit is due to the officers responsible for carrying out the orders issued, and it is greatly to be deplored that three machines out of the little detachment are missing—as notified in the Communiqué of the 26th inst. and in the German report.

No condemnation can be sufficiently strong for any politicians who may have insisted on the orders being given.

To begin with, dropping bombs on Alsace-Lorraine is not dropping bombs on Germany, so politically the raid seems merely a subterfuge to humbug the British public. We are supposed to be fighting for the liberation of Alsace-Lorraine from the German yoke. Alsace-Lorraine has been called Germany's Ireland. Does anybody suppose that England would be mightily upset if someone bombed Mr. de Valera and his Sinn Fein friends in the County Clare? How, then, can we expect to upset Germany by bombing Alsace-Lorraine? Therefore if the time or matériel was right, the place seems wrong.

Notwithstanding the foregoing paragraph, Burbach, Saarbrücken, the Briey Basin, and all that district generally ought to be bombed—as was stated many months ago in this paper—because from that district Germany draws an enormously high percentage of her steel and iron. But if it is to be bombed it should be bombed thoroughly.

Quantity.

Now five tons of bombs which have only to be carried such a short distance as these were merely represent the load of half a dozen machines of the modern type. Probably ten Gothas could carry as much from Ghent to London despite the extra petrol needed for the extra distance. And if bombing operations are to be organised on a scale which is worth while, they should be carried out not by five or ten machines but by fifties and hundreds. Until they can be carried out on such a scale it is obvious that the proper moment has not arrived.

It might be worth while to send five or ten machines at irregular intervals to one or two of the great German manufacturing centres, for the sake of moral effect, and to force the Germans to withdraw men and guns and aeroplanes from the fighting line to defend those centres, but to risk five or ten machines over strong anti-aircraft defences for such a purpose is bad tactics and is not strategy at all. It is merely political eye-wash.

Practice.

Moreover, it provides the Germans with practice in meeting our small-scale attacks, so that they may develop those defences against bigger attacks to come. We made the same mistake in putting the "tanks" into action on the Somme before we were ready. The Germans made just the same mistake in sending Gothas a dozen at a time to practise on Folkestone and Harwich and such places, and to attack London in small numbers in broad daylight. They gave us just the warning and experience and practice which we needed, whereas they could have had far greater effect if they had made a few really big raids at night before we were ready for them.

Now that our defences are properly prepared in the light of experience it does not matter when German raiders arrive, for they will meet an equally warm reception in any case. Yet when it comes to attacking Germany we not only repeat their mistakes exactly, but we go and attack in the very place where we tried to attack them a year ago, where they have been preparing strong anti-aircraft defences ever since, and where our gallant Allies the French have been keeping them thoroughly on the alert at frequent intervals.

Weather.

Finally we read that the weather conditions were good at first and then changed for the worse, with a strong adverse wind. This also seems to indicate that the raid was not made at the proper moment. When the Germans raid England they almost always wait for a high barometer and an east wind, for with an east wind they have pretty well the whole continent of Europe behind them on which to draw for meteorological warnings of changes in the weather. And they can rely on five hours' warning before they start. The recent Zeppelin debâcle was one of their exceptions. They were then out on a gamble and lost.

With a westerly wind we, on our side, have the advantage in the weather forecasts. It would be interesting to know whether the flight which bombed Burbach and Saarbrücken had a proper meteorological service or not, and if they had it whether they used it. In any case, it is obvious that such a change in the weather was foretellable, and that being so it is equally obvious that the proper moment for a raid had not arrived, even if the raid was to be made under political pressure.

Strategy.

If the bombing of Germany is to be carried on as a strategical operation, it must be done properly. Bombing machines must be used in numbers adequate to the achievement of their object. They must attack the right places at the right times. And they must be used with due precautions for their chances of safe return, not because of any particular tenderness towards their crews, but because big bombing machines and trained crews are valuable assets not lightly to be thrown away.

Bombing raids in small numbers at long-drawn-out intervals are simply futile and wasteful. I am all in favour of bombing Germany to Hell if it be done properly, but I protest strongly against matériel and personnel being risked merely in order to fill newspaper headlines or to enable Mr. Bonar Law to forestall agitators and score off Mr. Pemberton-Billing.—C. G. G.

SOME THOUGHTS ON ORGANISATION.

BY T. HOWARD WRIGHT.

[Mr. T. Howard Wright, until lately Manager of the Aviation Department of J. Samuel White & Co., Ltd., of Cowes, contributes hereafter some philosophy on organisation, a subject in which we, as a nation, do not excel. Mr. Howard Wright's views deserve the close attention of all who are concerned with the task of meeting and beating Germany's threatened output of aircraft in the coming winter.—C. G. G.]

A very well-known public man has described the war as a kind of "European Beecham's Pill." This remark, like German official statements, has "a good deal of truth in it." The war is of course indescribably horrible to the individual, but the total result to Europe will undoubtedly be a great improvement in the race. Perhaps the most remarkable result up to the present has been that Europe has been forced to consider the greatest force in the world (next to the propagation of species), and that is what is generally termed organisation, together with all that it means.

It is generally recognised that the reasons Germans have been able to hold up practically the whole of the world in arms is that since 1850 they have studied and practised organisation. Von Moltke was the greatest organiser the world has ever seen. He was the first man to recognise the difference between organisation, discipline, and system.

Very large numbers of men have introduced discipline and systems of a very varied character, and as long as the genius who introduced them lived and was in charge, wonderful results were obtained. But as soon as the ruling hand was removed the systems fell into disuse. Von Moltke the Organiser, with the assistance of Bismarck the Statesman, introduced an organisation which has existed long after both of them were removed.

Mr. Emerson, in his very able work entitled "The Twelve Principles of Efficiency," points out that nature is the most wonderful organiser. He puts it in the following way: "Life is the ideal, the body is the organisation, eyes and ears, smell and taste, above all touch, hands and feet, teeth, clothes, houses, weapons, are the equipment, and the brain is the leader, the commander."

Many people think that life is the most disorganised thing in the world, and they can see in it no organised plan. They see only the terrible mess which some people make of their lives, and forget that, notwithstanding all the strife and vice there is in the world, life as a whole proceeds, no matter what the individual or even the nation may do. No amount of ignorance or mal-government can alter the general plan.

It is thought that this is just because the whole thing is based on very simple laws, and the breaking of any of these laws either through inclination or ignorance carries its own penalty at once, and that the individual is of no real importance, no matter how very great he may be locally.

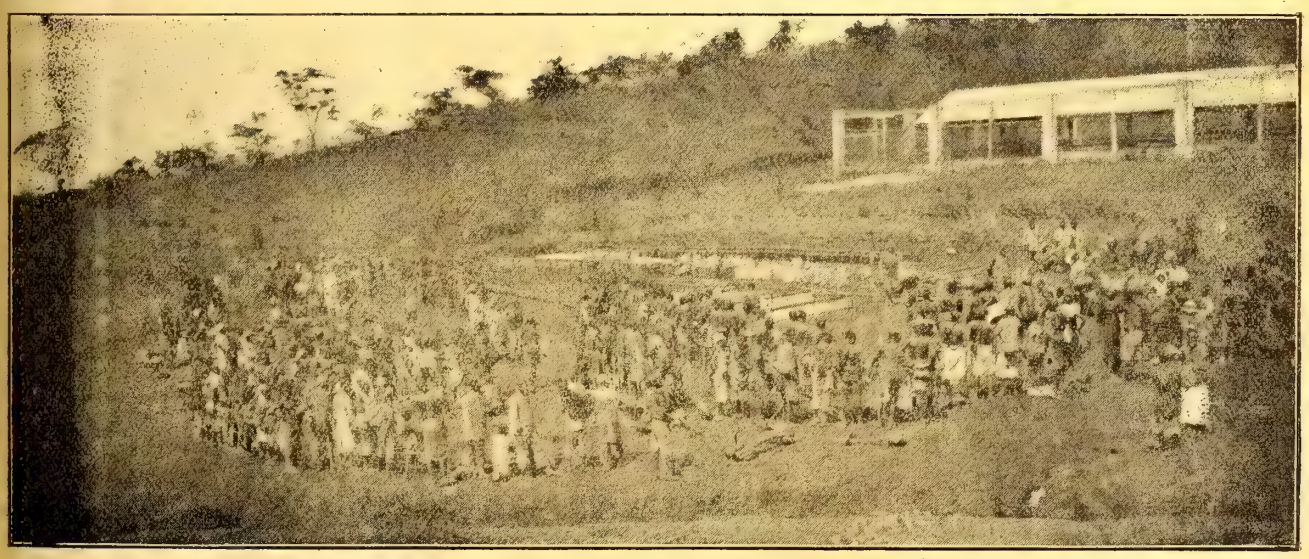
Why Organisations Fail.

Human organisation as applied to business can only copy nature very imperfectly, because the results must be *immediate* and the unlimited time available to nature cannot be employed. Organisation, as generally understood, consists of a system of control enforced by discipline, the popular idea of discipline being a "whip." A very large number of such systems have failed hopelessly, and many others are generally unpopular:

Because they are a trouble and not a pleasure to work.
Because they have not the good will of heads of departments.
Because they are not elastic.
Because they are carried to excess.
Because records are not immediate and reliable.
Because they do not provide for the human element.
Because they depend upon individuals.

Every commercial organisation must, of course, have a system and discipline, but the finest system and the strongest discipline in the world will fail if it contains any considerable number of these disadvantages. It is, of course, recognised that a genius can by his own force of character make a success of an entirely faulty organisation, but, unfortunately, there are not enough genii to go round. Therefore every system should be designed so that men of average mentality can run it.

This can only be done by first setting down in writing definite ideals or governing principles. If these principles are sound, the working out of the details of any system or plan, to deal with almost any conceivable circumstance, is a comparatively simple matter, of course assuming that these details are thought out by experts in any particular branch.



ORGANISATION UNDER DIFFICULTIES.—With the R.N.A.S. in East Africa. Some 300 niggers waiting to take their loads of petrol cans, spares, and provisions. The building in the background is a lion-proof cow-shed.

Opposition to Organisation.

The very strenuous opposition to organisation is most extraordinary. It is found in all forms of animal life, but in the lower forms of life, as typified in plants and trees, organisation is not opposed.

Vegetable life takes its support from a very large number of sources—the sun, the air, moisture, the earth—and collects its supply through thousands of channels. Animal life gets its support by destroying other life at enormous waste—in other words the vegetables are constructive and the animals destructive. The one is based on the collective and the other on individual control.

It is probably this basic principle which causes opposition in all humans to the central idea of organisation. This being so, the first principle must be that the individual must be recognised and a definite amount of responsibility attached to him, which authority must be upheld by all his superiors. Discipline, as generally applied, disregards this principle, especially in the lower grades. There can be no doubt that if every man feels that he is of some importance in the system of things he will do far better work.

Unsuitable Work.

A second great principle is that the individual should be put to do work that he can do *well*, and not such work as that for which his general temperament unfits him, as in that case the work becomes irksome and the result is disastrous. If Mr. Lloyd George were put to address envelopes, he would, no doubt, do it very badly, and have a very much worse output than a dear little lady at 30s a week, who was an expert at that class of work.

This extreme example might sound absurd, but how many cases have we all seen of men and women doing work for which they were entirely unsuited. It is natural to ask how this can be avoided. A good organisation would provide a man of discrimination who would spend his whole time fitting round pegs into round holes.

Doing Too Much.

A third principle is that no man should have too much to do. This is not to be avoided by increasing the number of men but by preventing the individual from doing unnecessary work. Have you ever thought of the amount of time which is wasted in all the works in England by the heads of departments talking about unnecessary things in business hours? If the business world were put upon a conversation ration of so many words per day, we should all have so much time on our hands that we should not know what to do with it,



ORGANISATION IN EAST AFRICA.—The frame of a balloon shed, some observation balloons, and a hydrogen plant, very much in the wilds.

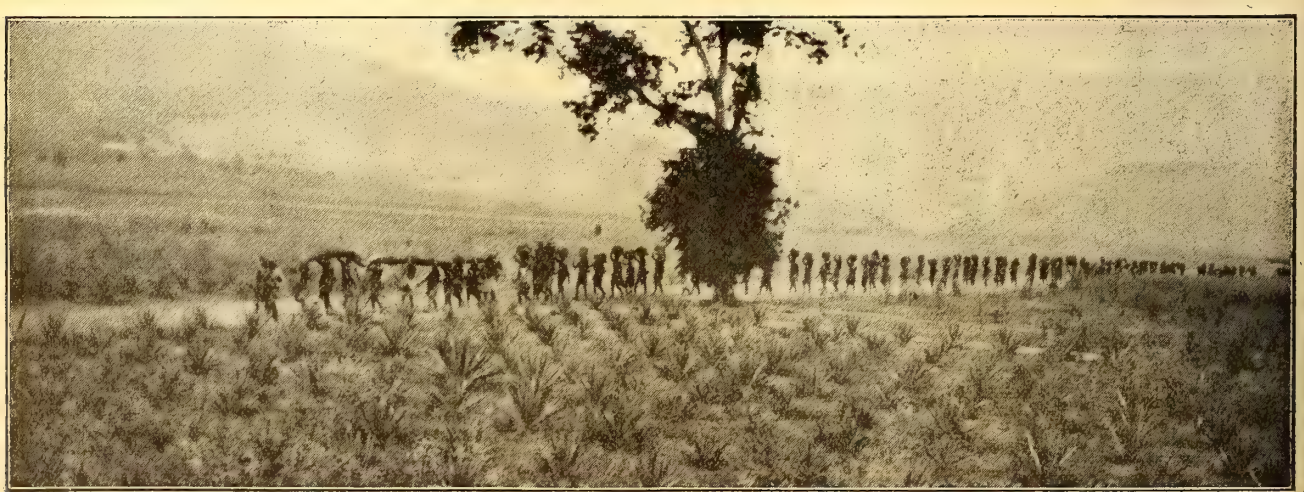
and should have to spend a good deal of our time in that objectionable practice known as "killing time."

Another great principle is that records should be immediate and reliable. Records are things that are unanimously hated, and most people consider that they are of very little, if any, value, because their experience is that records can never be found when required, and are about as reliable as the proverbial statistic or the evening newspaper. Although records have a very bad name, they can be made a joy and not a reproach, if they are immediate and reliable.

They can be made immediate by eliminating the unnecessary, and using diagrams instead of figures, and they can be made reliable by providing four checks of everything technical and two checks of everything commercial. The checking, however, should not be based on one man doing the work and another man going over it again. That is not an efficient check, and is waste of work.

Technical Checking.

As an illustration of technical checking in an aeroplane works, certain fittings are required for a fuselage.



ORGANISED.—The party of the previous illustration, properly organised, passing through a sisal plantation. The snake-like object in front is canvas for a dismountable hangar.

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KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

A workman advises the charge hand that he requires a certain fitting or group of fittings. The charge hand makes out a demand, which he hands to the storekeeper's clerk, who has in his office a board with a number of hooks in a line opposite each fitting or group of fittings. Upon each hook is hanging a tally representing the numbers of that particular fitting which are in the stores.

This tally is handed to the storekeeper, who has in his finished stores a dummy fuselage with the fittings hanging in the actual places where they will eventually be fitted, and he hangs up the tally on his own board, showing that the fitting has been despatched.

The charge hand can see that these clips are being taken from the actual place where he requires to fit them. The tally is of a distinctive shape for each fitting, so that he can see at a glance if he hangs it up on a wrong row of hooks. The storekeeper's clerk can see at a glance if he has the fittings in store. And, if a mistake is made, it is bowled out either by the workman, the charge hand, the clerk, or the shape of the tally.

Here is a record which is immediate and reliable. This involves no trouble for the head storekeeper or the process manager, and they can both see at once if they are getting short of any particular fitting. If desired, the record can be made more forceful and picturesque by arranging that when less than a certain number of tallies are hung upon the hooks in any particular line a red light is automatically switched on, which cannot be extinguished until further tallies have been hung upon the hooks.

Another great principle is the elimination of waste, both of time, material, and energy. The advantages of economy are, of course, obvious, but it is most difficult to practise and can be carried quite easily to excess, when it becomes as pernicious as any other virtue which is overdone, and becomes almost a vice. One has heard of the man who boasted that he had purchased no new tools for five years, and had saved many thousands of pounds thereby. In six years he was out of business.

Elimination of waste is an idea rather than a definite plan, and has to be instilled in the mind of every individual in the organisation with a definite written statement as to the type of thing which constitutes waste.

It is waste for the managing director to spend two hours a day speaking on the telephone.

It is waste to put in an automatic lathe to turn out a part from the solid which can be more cheaply made from a forging.

It is also waste for any man to do work which can be done by another man of less mentality than himself.

Perhaps the most wasteful type of business man in the world is the one who wants to do everything for himself. He opens his own letters, reads them all through, writes a reply, addresses the envelope, stamps and posts it, and tells you that he does this in order to save mistakes, and that his customers prefer personal attention. He is the kind of man who would wish to dig his own grave, get inside, and pile the earth in on top of himself.

This type of man is born of egotism. In principle it is very general, and, carried to excess, is fatal to any form of organisation.

THE AERONAUTICAL HISTORY EXHIBITION.

Lord Cowdray, President of the Air Board, has promised to open the Official Air Services Exhibition on November 1st at the People's Palace, Mile End Road. The proceeds are to be given to the Royal Flying Corps Hospitals. The exhibition, of which the Countess of Drogheda is the honorary organiser, has already been seen in several provincial towns.

Recently there has been added a Gotha, a specimen of the latest type of German flying machine that has been raiding London, and there are to be shown 800 photographs of the German lines taken by our aviators at the front. More hospitals for flying men are being opened, and funds are urgently needed.

AIR RAID RECREATIONS.

Dr. F. B. Meyer, of Christ Church, Westminster Bridge Road, has arranged to give air-raid shelter to the full capacity of the church. A cup of coffee is to be supplied for a farthing, and chess and draughts may be played.

AIRCRAFT IN THE HOUSE.

Shortage of Engine Parts.

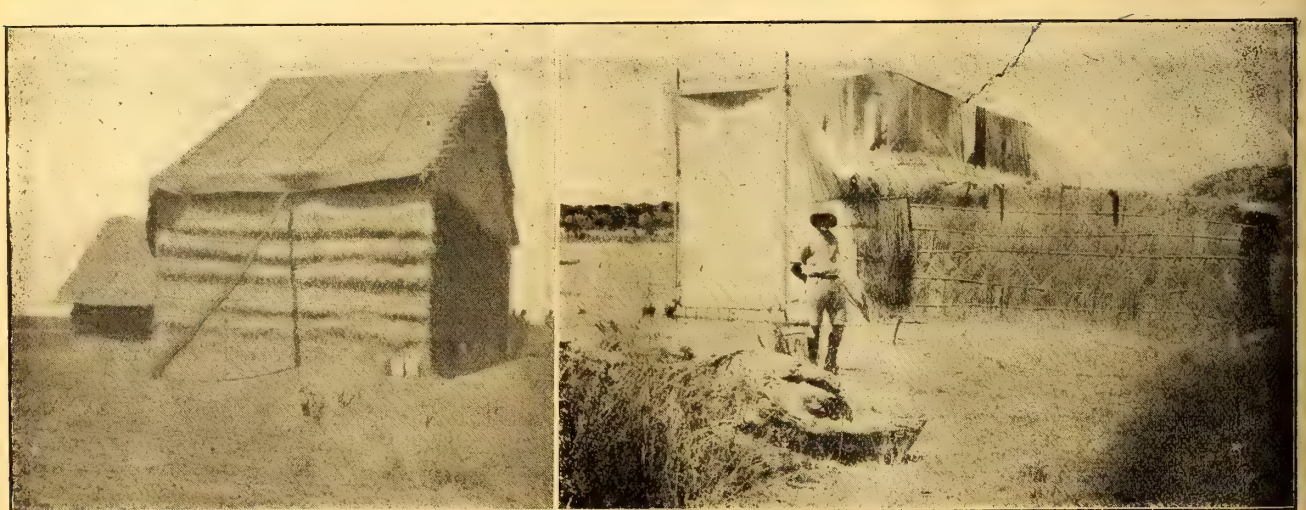
On Oct. 25th, **Sir L. Worthington Evans,** replying to **Colonel Sir Norton Griffiths,** said: There is no general shortage of aero-engine spares. Shortages occur at times, for special reasons, in connection with individual spare parts. Emergencies of this nature are met, when they arise, by making the best use of the resources at the disposal of the Ministry.

The Air Ministry.

On Oct. 25th **Mr. Kennedy Jones** asked when the Government hoped to be able to introduce the new Air Ministry Bill.

The Chancellor of the Exchequer (Mr. Bonar Law): As soon as the time of the House enables us to do so—probably the week after next.

Mr. W. Thorne (West Ham, S., Lab.): Why not meet to-morrow, then?



ORGANISATION BY THE R.N.A.S. IN EAST AFRICA.— On the left a grass aeroplane hangar, built by niggers, with a grass hut behind to take the tail of the machine. On the right, a canvas hangar, the poles for which had to be carried on man back for 80 miles. The tail of the machine is housed in a grass hut, as in the previous case.

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REGISTERED

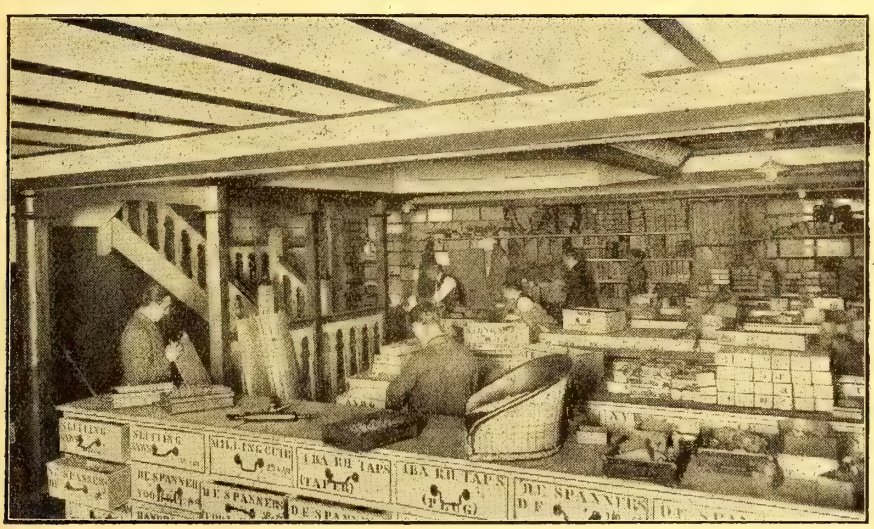
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VOLUME 2, No. 10, Now Ready, contains an article on "Dope and how to use it," by A. J. Wallace Barr, a comprehensive Strainer Equivalent Chart enabling manufacturers to find suitable substitutes for those strainers which are difficult to obtain, Enquiry Bureau, an extract from the "Book of Artemas"—one of the really humorous books of the war, in addition to Our Complete Illustrated Stock and Quotation List.

VOLUME 2, No. 11, Ready Thursday next, November 8th, will contain illustrated articles on "The Manufacture of A.G.S. Bolts," by G. H. Mansfield, and on "Standard A.G.S. Parts for Aircraft," by Bernard Isaac, and several original charts specially prepared for the use of Aircraft Manufacturers. (Forms of application for copies of THE A.G.S. BOOK may be had from 166, Piccadilly, London, W.1.)

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ASCOL GENERAL SERVICE MEANS INCREASED OUTPUT!

The New Zeppelins.

Mr. H. Warner Allen, writing in the "Morning Post," from the French Front, on Oct. 26th, says :—

The capture of a super-Zeppelin with all its crew and papers has thrown some interesting light on the progress made by German airships since the days not so very long before the war when a German dirigible paid an accidental visit to Lunéville, and was carefully overhauled by the French air experts before it returned home.

The Zeppelins that came to an untimely end the other day in France are believed to have been of the latest type. Six hundred and forty-three feet in length, their total height is 114 feet, and their eighteen balloons enclosed inside the aluminium framework contain 55,000 cubic mètres (about 1,060,000 cubic feet) of hydrogen. In other words, they can raise 55 tons from the ground.

Their aluminium structure weighs between ten and twelve tons, and to this burden must be added five Maybach motors, each of 240 horse-power, the cars and balloons, the crew, petrol, ballast, and the thousand and one appliances necessary for an aerial voyage.

Allowance being made for all these encumbrances, just two and a half tons at the very most remain for explosives, if they are to be dropped on England.

The amount of bombs that can be carried depends, of course, first, on the amount of petrol that must be carried to enable the airship to reach its destination and return; and, secondly, on the height at which the voyage is to be made. If it is to fly at a great altitude much ballast must be carried and the weight of bombs proportionately decreased.

The Germans have learnt by bitter experience that if they intend to drop bombs on England without excessive risk from guns and aeroplanes they must navigate at a very great height, and their Zeppelins are built with a view to flying at between 16,000 and 20,000 feet.

At such an altitude they reckon that they should be reasonably safe both against shells and heavier-than-air craft. As a matter of fact, there appears to be some slight error in their calculations, since the other day one Zeppelin was brought down from a height of over 16,000 feet.

Wireless Bearings.

The enemy has overcome the vital difficulty of steering when the earth is out of sight by wireless telegraphy. The airship sends out a wireless message, which is received by the German land stations, and as soon as they have determined the direction from which the wireless waves come they can easily arrive at the exact position of the airship and tell it where it is.

The other night the German airships had to struggle against exceptional atmospheric conditions. Take the log of the captured airship. It started out with a gentle West wind that impeded its progress but little, and promised to waft it back most conveniently if anything went wrong. But, all unknown to the enemy, a depression was working up in the Mediterranean. On their journey the wind at a high altitude suddenly veered north and blew with great violence. It was a wind of about 80 feet a second, or about 50 miles an hour.

[Probably this wind was blowing all the time above a certain height.—Ed.]

The Zeppelin, with all its motors working at full power, could travel at rather more than 60 miles an hour, so that if the pilot had been aware of the change of wind he could have gone back to Germany without excessive difficulty. The north wind was not directly contrary, so that he would only have had to make allowance for it in steering his course.

But it so happened that the pilot of the airship in question had no idea of what was happening. The earth was covered with a thick mist, and he had no fixed point outside the balloon to show him that he was being carried swiftly southwards. When he had dropped his bombs he had only one idea—to rise as high as he possibly could to get out of the reach of aeroplanes and guns. So he went up to a height of no less than 22,000 ft. At such an altitude the cold was intense. The temperature fell to over 30 deg. below zero (Fahrenheit). The crew suffered terribly, and, to make things worse, as a result of the excessive cold two motors broke down, including the motor that worked the wireless.

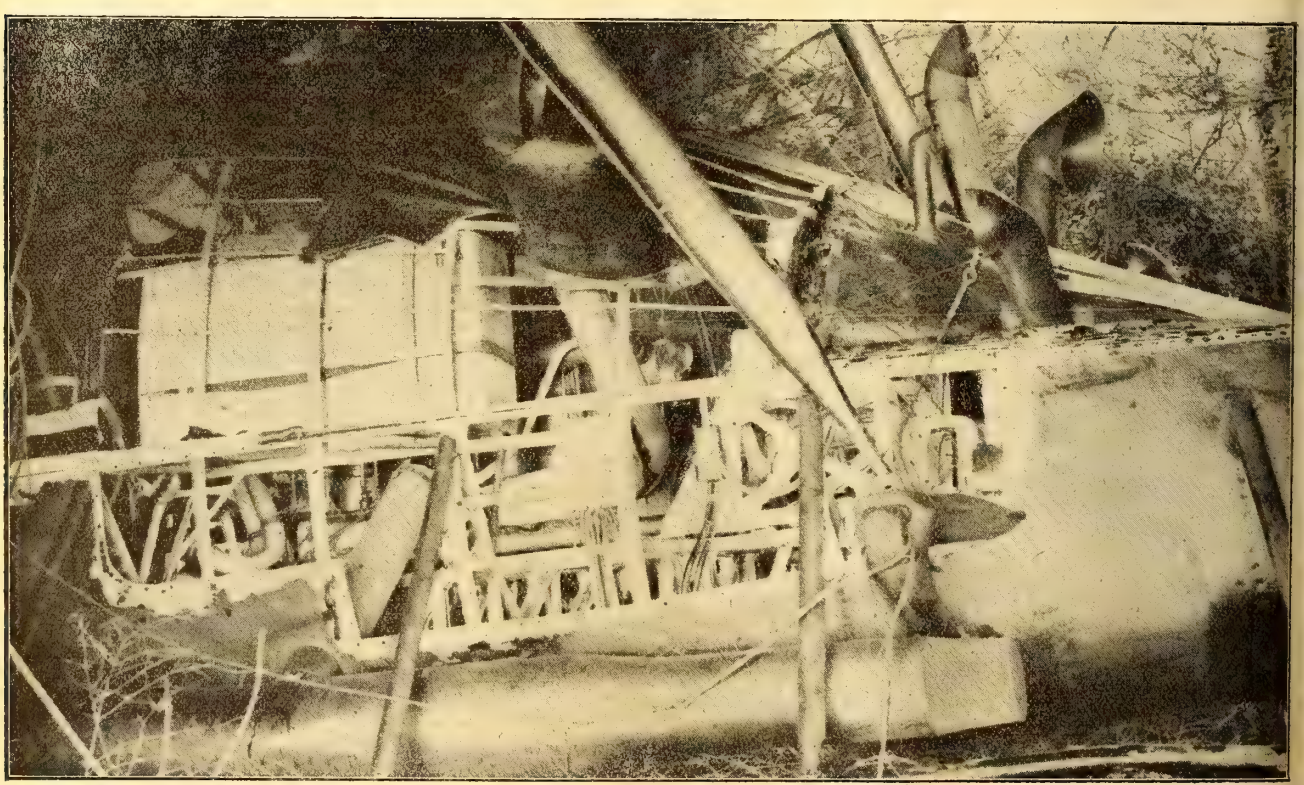
Thenceforward, there was no question of steering a course. The pilot, of course, tried to make for Germany, but, all unawares, he was being drifted southwards by the wind at the rate of 50 miles an hour. At length he let out gas and came down, hoping to find himself above Holland. What he found was a squadron of French aeroplanes waiting for him over Bourbonne-les-Bains. The whole crew was bewildered by the terrible cold to which it had been exposed, and had no fight left in it. The airship's armament was almost negligible, only two machine-guns. The result was that the dirigible and its crew were captured.

Motor Arrangement.

It has been said that the Zeppelin carries five motors. Three of these motors are in the forward and two lateral cars, while the stern car has two motors. Each car has only one propeller in the stern. The two motors of the stern car only work simultaneously in case of grave necessity. If they are both geared up to the propeller the balloon is under forced draught, with a speed of about 60 miles an hour. As a rule, only four motors are working, and the fifth is in reserve.

They are all provided with effective silencers, so it is by no means surprising that they should have been able to pass over London at a great altitude unheard.

A disadvantage often urged against the rigid balloon before



A close view of a power-egg of L49, with the fabric covering removed. Note the close packing of the whole power-plant. The various "breathers" for the engine are of interest.





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the war was the danger of the spaces existing between the balloons or ballonnets containing the hydrogen. Hydrogen and air form an explosive mixture, and the peril is increased by the petrol vapours that ascend from the motors.

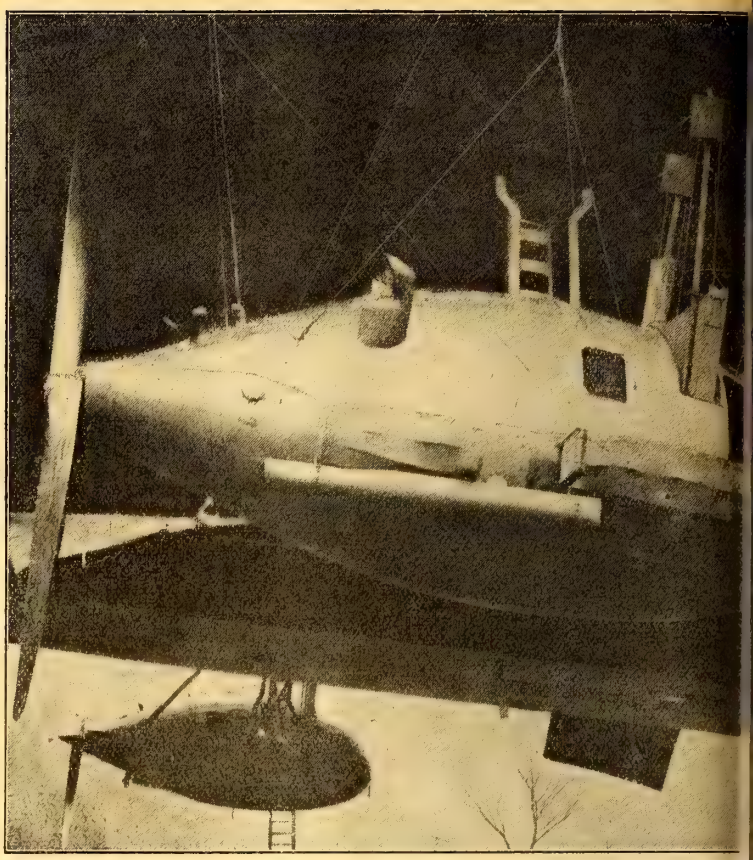
[Presumably Mr. Allen means petrol-gas from the carburettors or from leaky joints. Burnt petrol vapour from the motors and an inert gas which cannot burn or explode.—Ed.]

No balloon is absolutely gas tight, and a certain amount of gas must leak into the intervals between the ballons, which are contained and held down by nets in the canvas-covered aluminium structure, and must there mix with air and petrol fumes. Several Zeppelins have been destroyed by the explosion of the mixture thus formed, and in the latest type there is a chimney running up to the outer air in every interval to carry off the gas.

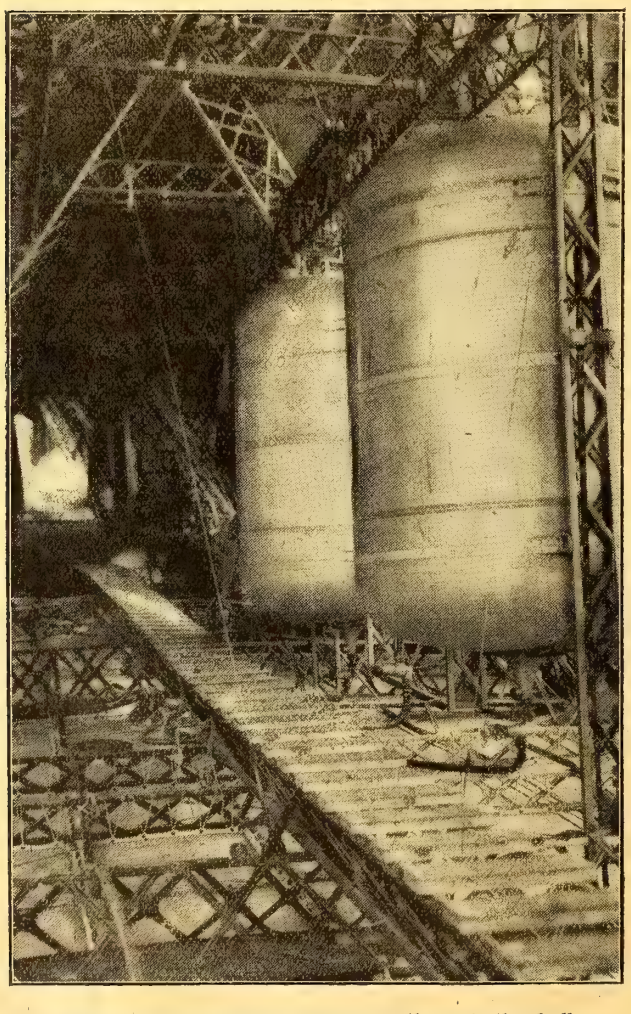
The ballonnets are made of cotton fabric doubled with goldbeater's skin, the lining of the intestines of cattle. An ox only provides about half a square metre of this membrane, so that if a vague calculation can be trusted it would take three hundred thousand oxen to provide the skin required for a single Zeppelin.

The super-Zeppelin, it has been said, has a platform with a machine-gun on the top of the gas-bag as a defence against aeroplanes, the platform being connected with the passage at the base of the balloons by a well with a long ladder. This arrangement does not exist in the type taken.

The balloon commander is in the forward car, with the greater part of the crew. It was this car that was carried away by the trees on which the Zeppelin landed at Dammartin. The total crew for short raids is 22, for long raids 18. The Germans continue the construction of airships at the rate, according to prisoners, of two a month. They are provided with water ballast, which, to prevent freezing, is mixed with alcohol. In the captured airship the water was frozen as there was an insufficient quantity of alcohol.



The side-by-side engine cars, commonly known as "pow eggs." Note the arrangement whereby the radiator is rais from and lowered into the egg, according to circumstances temperature. It will also be noticed that the egg is a mu better streamline than formerly. This fact, together with t entire abolition of the side-screws, with all the outside sc folding, which was a feature of the earlier Zeppelins, proba accounts for the newer type being able to cruise comforta with only four engines, and to carry a fifth engine specia tuned for work at very high altitudes.



Looking down the central gangway through the hull.

According to the prisoners, the German Emperor hims plans out and directs the raids undertaken by the Zeppelins.

* * *

A supplementary statement dated French Headquarters, C 25th, says :—

On the night of the raid the Zeppelins, steering at a height 15,000 ft. and afraid to descend to a lower altitude, found the selves caught in a violent and bitterly cold northerly gale. T wireless directives went astray or arrived in undeciphera shape, and the airships, soon after reaching the English coa lost their bearings. It is probable from prisoners' statements t most of them dropped their bombs as soon as they convenien could without much regard to objectives, and bolted for safety

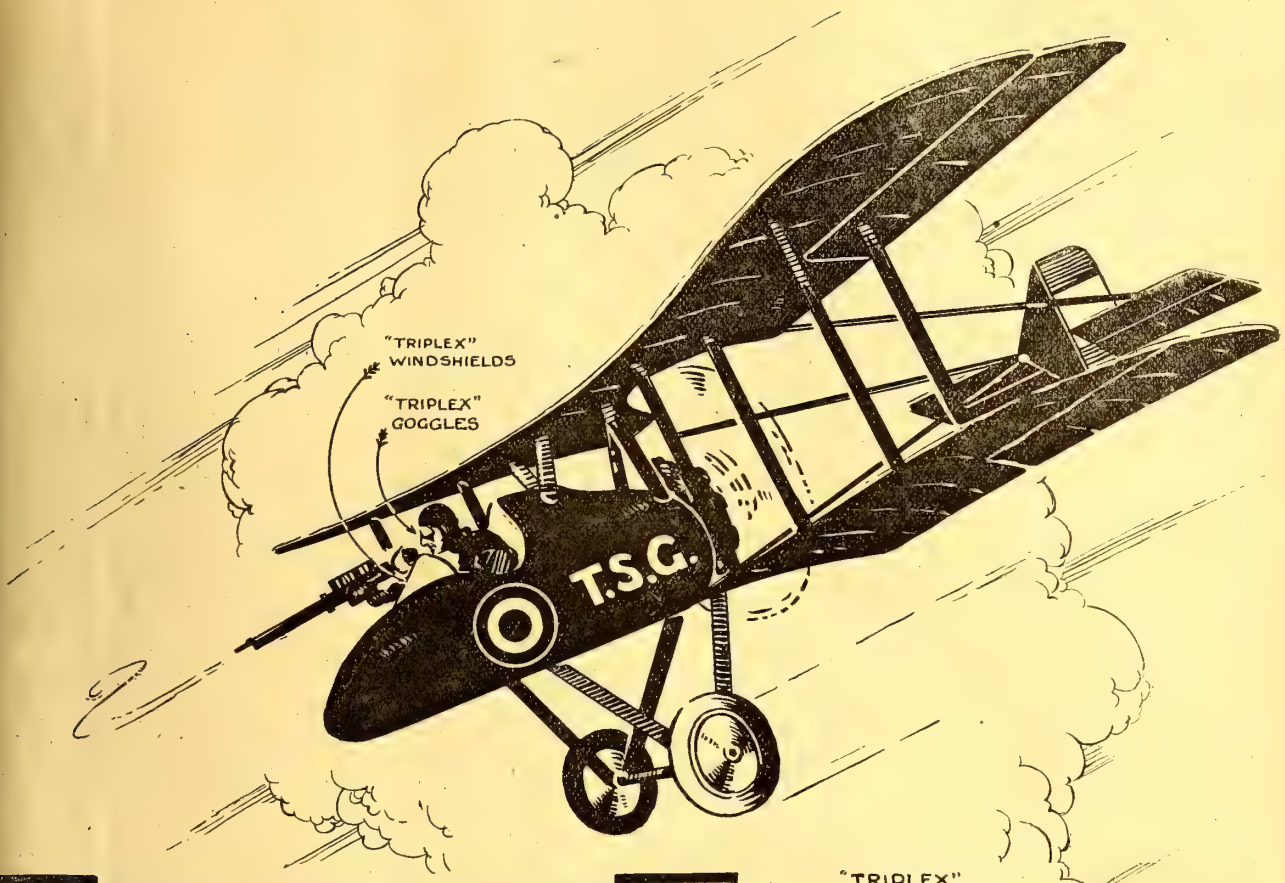
The first wireless message they received as they were cross the Channel, although not encouraging for the Zeppelin cre will be interesting to British readers. It was as follows: "Zep lin training ship broken loose with nobody aboard and be carried away by wind." No further news has been received this airship in France.

* * *

The "Daily Chronicle's" special correspondent is evider weak with his figures. He correctly states that the length L49 is about 650 feet long, and about 116 feet high, and t goes on to say that its capacity is 183,000 cubic feet. He evidently attempted to convert cubic metres into cubic feet employing the factor for converting linear metres into lin feet, instead of multiplying by 35.3.

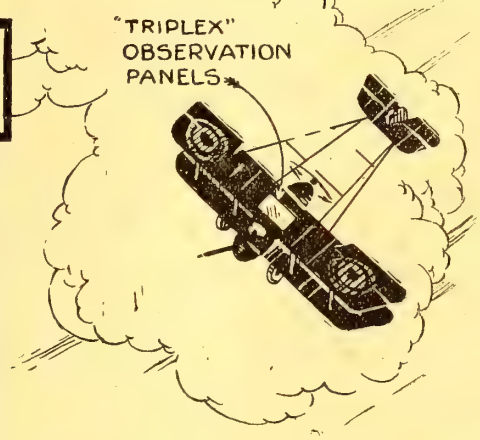
The photograph at the top of the page will show very clea the general arrangement of the power-eggs, with their pus air screws. The ladder leading to the main gangway can clea be seen, also the bomb-traps in the floor of the hull.

In the photograph below to the left, the outer fabric can seen laced to the lower girder work. The neat petrol tanks noteworthy, as is the "steel-yard" to the right of the photogra which can be seen in front of the vertical girder, and which parently acts as an indicator of the volume of hydrogen in gas chamber above, or as a petrol gauge. The footway, wh is about 12 inches wide, gives some idea of the relative sizes the different parts.



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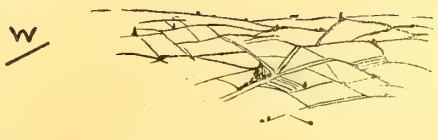


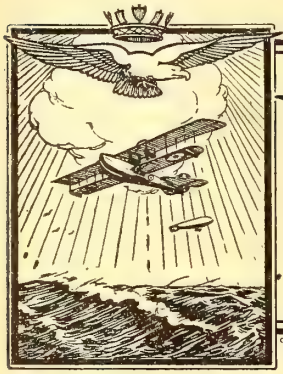
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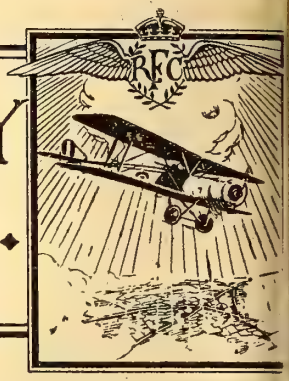
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NAVAL and MILITARY AERONAUTICS



FROM THE "LONDON GAZETTE."

ADMIRALTY, Oct. 16th.

Oct. 18th.—Actg. Sqdn. Comdr. to be Sqdn. Comdr.—R. B. Ward, July 26th.

WAR OFFICE, Oct. 23rd.

REGULAR FORCES—GENERAL STAFF.—G.S.O. 3RD GRADE—Lt. W. A. Hunter, Gen. List, from a Flying Officer, and to be temp. Capt. whilst so empld., Oct. 15th.

ESTABLISHMENTS.—R.F.C.—MIL. WING.—Wing Comdr.—Capt. (temp. Maj.) T. F. Rutledge, Spec. Res., from a Sqdn. Comdr., and to be temp. Lt.-Col. whilst so empld., Oct. 6th.

Flt. Cmdrs.—From Flying Offrs.—Capt. L. W. Hopkins, Canadian Local Forces, Aug. 2nd; temp. Capt. C. N. Jones, Notts and Derby R., Oct. 5th. And to be temp. Capts. whilst so empld. Temp. Lt. C. Courtneidge, Gen. List, Oct. 8th; temp. Sec. Lt. G. M. Turnbull, Gen. List, Oct. 18th.

SPECIAL RESERVE OF OFFICERS.—SUPPLEMENTARY TO REGULAR CORPS.—R.F.C..—MIL. WING.—Lt. (temp. Capt.) L. C. Angstrom relinquishes his commn. on joining the American Aviation Service, and is granted the hon. rank of Capt., Sept. 15.

WAR OFFICE, Oct. 24th.

REGULAR FORCES—ESTABLISHMENTS.—R.F.C.—MIL. WING.—Flt. Comdr.—Capt. T. E. Withington, Oxf. and Bucks. L.I., from a Flying Officer, Oct. 6th.

Special Appt.—(Graded as an Equipment Officer, 1st Cl.)—Temp. Lt. C. H. D. Bonnett, Gen. List, and to be temp. Capt. whilst so empld., Sept. 26th.

MEMORANDUM.—Col. Sir H. C. L. Holden, K.C.B., to be Hon. Brig.-Gen., Oct. 25th, 1917.

WAR OFFICE, Oct. 25th.

REGULAR FORCES—ESTABLISHMENTS.—R.F.C.—MIL. WING.—Flt. Cmdrs.—From Flying Officers.—Capt. H. J. Edgar, Ches. R., T.F., Sept. 1st. And to be temp. Capts. whilst so empld.—Lt. J. D. Belgrave, M.C., Oxf. and Bucks. L.I., Temp. Sec. Lt. S. Cockerell, Gen. List, Sept. 1st; Sec. Lt. W. B. Ives, W. York R., Spec. Res., Sept. 30th; Temp. Lt. G. H. Hackwill, Gen. List, Lt. L. F. Hutcheon, Spec. Res., Oct. 1st; Temp. Lt. J. C. B. Firth, Gen. List, Oct. 8th; Sec. Lt. (temp. Lt.) J. Cairns, M.C., R.E., T.F., Temp. Sec. Lt. H. G. Reeves, Gen. List, Oct. 9th.

WAR OFFICE, Oct. 26th.

REGULAR FORCES.—GENERAL STAFF.—G.S.O.—3rd Grade.—Lt. (temp. Capt.) I. H. D. Henderson, M.C., Arg. and Suth'd Highrs., from a Flt. Cmdr., R.F.C., and to retain his temp. rank while so empld., Oct. 11th.

ESTABLISHMENTS.—R.F.C.—MIL. WING.—Flt. Comdr.—Lt. A. P. Dickie, R. Highrs., T.F., from a Flying Offr., and to be temp. Capt. while so empld., Oct. 1st.

Depot Comdr.—Lt. (temp. Maj.) N. Goldsmith, R.A., from a Park Comdr., and to be temp. Lt.-Col. whilst so empld., Oct. 10th.

Special Appointments.—(Graded as Equipment Officers, 1st Cl.)—Capt. C. C. Waddington, Hamps. R., Sept. 10th; Capt. E. R. Beney, Suff. R., T.F., and to be secd., Sept. 27th.

Experimental Officers, 1st Cl.—(Graded as an Equipment Officer, 1st Cl.)—Lt. J. R. H. Whiston, Notts and Derby R., T.F., from the 2nd Cl., and to be temp. Capt. whilst so empld., Oct. 1st.

2nd Cl.—(Graded as Equipment Officers, 2nd Cl.).—From the 3rd Cl. (graded as Equipment Officers, 3rd Cl.).—Temp. Lt. W. H. Hoffert, Gen. List; Sec. Lt. (temp. Lt.) W. W. Stainer, R. Suss. R., T.F., Oct. 1st.

SCHOOLS OF INSTN.—SCHOOL OF TECHNICAL TRAINING.—Instr.—(Graded as an Equipment Officer, 1st Cl.).—Sec. Lt. (temp. Lt.) R. G. Booth, Spec. Res., from an Equipment Officer, 2nd Cl., and to be temp. Capt. whilst so empld, Oct. 22nd.

Gen. List.—Actg. Sgt. A. E. Cartland, from R.F.C., to be temp. Sec. Lt., Sept. 29th.

WAR OFFICE, Oct. 27th.

REGULAR FORCES—ESTABLISHMENTS.—R.F.C.—MIL WING.—Wing Cmdrs.—From Sqdn. Cmdrs., and to be temp Lt.-Cols. whilst so empld., Oct. 8th:—Capt. (temp. Maj.) R. G. D. Small Leins. R.; Capt. (temp. Maj.) C. S. Burnett, Res. of Off.; Capt (temp. Maj.) W. H. C. Mansfield, D.S.O., Shrops. L.I., Oct 15th.

Sqdn. Cmdrs.—From Flt. Cmdrs., and to be temp. Majs. whils so empld.:—Lt. (temp. Capt.) C. R. Rowden, M.C., Worc. R. Lt. (temp. Capt.) E. R. Pretyman, Som. L.I.; Capt. H. W. vo Poellnitz, Linc. R., July 2nd; temp. Sec. Lt. (temp. Capt. C. H. R. Johnstone, Gen. List, July 6th; Lt. (temp. Capt I. T. Lloyd, S.W. Bord., July 16th; Capt. A. C. Clarke, Welsl R., Aug. 1st; Capt. R. H. Freeman, M.C., Worc. R., Spec Res.; Lt. (temp. Capt.) G. D. Hill, Hrs.; Lt. (temp. Capt.) J. L Chalmers, M.C., Spec. Res., Aug. 11th; Lt. (temp. Capt.) J. A Crook, M.C., Spec. Res., Aug. 15th; temp. Sec. Lt. (temp. Capt. H. B. R. Grey-Edwards, M.C., R.A., Aug. 18th; Capt. F. C Baker, D. of Corn. L.I., Spec. Res., Sept. 11th; temp. Sec. Lt (temp. Capt.) J. Sowrey, Gen. List, Sept. 20th.

Flt. Cmdrs.—From Flying Officers, and to be temp. Capts whilst so empld.:—Lt. F. McQuiston, R.F.A., T.F., Aug. 25th Lt. E. A. Packe, Oxf. and Bucks. L.I., Oct. 10th.

Park Cmdr.—Lt. (temp. Capt.) E. Stokes, Spec. Res., from a Equipmt. Officer, 1st Cl., and to be temp. Maj. whilst so empld. Oct. 1st.

Equipmt. Officers, 2nd Cl., from the 3rd Cl., and to be temp Lts., whilst so empld.:—Qrmr. and Hon. Maj. W. A. Webb, ret pay, late E. Lan. R., June 8th.

SCHOOLS OF INSTRUCTION.—SCHOOLS OF MIL. AERONAUTICS.—Assistant Instructors.—(Graded as Equipment Officers, 2nd Cl. from Equipmt. Officers, 3rd Cl., and to be temp. Lts. whilst s empld.:—Temp. Sec. Lt. L. R. W. Lloyd, Gen. List; temp. Sec Lt. A. E. Lindon, Gen. List; Sec. Lt. J. McDonald, Oct. 10th.

SCHOOL OF TECHNICAL TRAINING.—Instr. Graded as an Equip ment Officer, 1st Cl.—Maj. T. O. H. Lees, R.M.L.I., an Equipment Officer, 1st Cl., Sept. 14th.

Gen. List.—Following, from R. F. C., to be temp. Sec. Lts.:—Serjt. W. A. E. Taylor, Serjt. G. F. Turner, Oct. 8th.

SPECIAL RESERVE OF OFFICERS.—SUPPLEMENTARY T REGULAR CORPS.—R.F.C.MIL. WING.—Lt. (temp. Capt.) J. Bel relinquishes his commn. on appt. to Australian Flying Corps, an is granted the hon. rank of Capt., Oct. 28th.

TERRITORIAL FORCE.—R.F.C.—Actg. Serjt.-Maj. J. H Meade to be Sec .Lt., Oct. 28th.

* * *

The King has been pleased to confer the following awards fo gallantry and distinguished service in the field. The acts o gallantry for which the decorations have been awarded will b announced in the "London Gazette" as early as practicable:—

THE DISTINGUISHED SERVICE ORDER.

Sec. Lt. A. P. F. Rhys-Davis, M.C., R.F.C., Spec. Res.

SECOND BAR TO THE MILITARY CROSS.

Lt. L. M. Barlow, M.C., R.F.C., Spec. Res. (M.C. gazette Aug. 25th, 1917) (1st Bar gazetted Oct. 16th, 1917).

BAR TO THE MILITARY CROSS.

Sec. Lt. R. B. Ashcroft, M.C., Notts and Derby. R., Spec. Re and R.F.C. (M.C. gazetted Sept. 26th, 1917.)

Lt. (temp. Capt.) G. H. Bowman, M.C., R. War. R., Spec. Re and R.F.C. (M.C. gazetted Sept. 17th, 1917.)

Sec. Lt. (temp. Lt.) R. T. C. Hoidge, M.C., R.G.A., Spec. Re and R.F.C. (M.C. gazetted July 18th, 1917.)

Sec. Lt. (temp. Capt.) J. T. B. McCudden, M.C., Gen. List an R.F.C. (M.C. gazetted March 12th, 1917.)

Lt. A. E. McKeever, M.C., R.F.C., Spec. Res. (M.C. gazette Sept. 17th, 1917.)

Sec. Lt. K. R. Park, M.C., R.F.A., R.F.C. (M.C. gazette Sept. 26th, 1917.)

Lt. (actg. Capt.) S. R. C. Plimsoll, M.C., R.F.A. (M.C. gazette March 3rd, 1917.)

Temp. Lt. (actg. Capt.) H. A. Redding, M.C., Suff. R. (M.C gazetted Nov. 14th, 1916.)

Sec. Lt. W. H. Richardson, M.C., Lond. R. (M.C. gazette Aug. 25th, 1917.)

(*Continued on page* 1293.)

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The British Aircraft Industry.

BY CHARLES L. FREESTON.

XXVIII.—THE BRITISH CAUDRON CO., LTD.

he Caudron aeroplane has one distinction to its credit which ot generally known. It was the first machine to "loop the ," the feat having been achieved by Chanteloup, a fortnight re Pégoud startled the aviation world with a more public formance. Chanteloup was on itary service, and one turned himself and his 60-h.p. hine upside down out of er exuberance, thereby gain- for himself 15 days "C.B." "insubordination."

One is under the impression t the Russian Lieut. Nes- ff had looped even before , but to Chanteloup belongs credit of being the first tern European to loop.—Ed.]

Early on the Scene.

efore that time, however, Caudron was well known in nce, M. Caudron having n his career in the air as back as 1908 on a machine l with a 25-h.p. Anzani or, from which small begin- it passed through many es until it attained the cate- of the "big" machine. competitions it scored many esses over a long period of s. Just before the war, I mber, being myself in na at the time, the Cau- s piloted by Chanteloup and et carried off the prizes for c rising and landing in a l space at the big aviation ing that was held in the rian capital in 1914, and et had just previously made orld's duration record on gle-seater Caudron, with a p. Anzani motor. The Cau- people, by the way, were rst to bring out an amphi- machine, with wheels and

A. M. Ramsay's Career.

A. M. Ramsay, the or of the British Caudron Ltd., had a bowing uintance with aviation so ack as 1909. He was in any, and had a passenger or two at Johannisthal, he signed on with the first Wright Company, which was d there. Baron de Caters, the famous Belgian motorist viator, was another passenger who shared the local en- sm for flying.

German Wright Company, however, went bankrupt shortly ards, and Mr. Ramsay's contract was annulled accordingly.



(*Photograph by Birkett*).

Mr. A. M. Ramsay.

He then went out to Turkey for the Standard Oil Corporation, but in January, 1912, he came back to England and decided to take up aviation in permanent fashion.

Cross-Channel Flights.

He then joined forces with Mr. W. H. Ewen, a well-known pilot at Hendon, and now a staff captain at the Air Board. They ran a flying school and agency at Hendon, and during 1912 sold a few Caudron machines, some in this country, some to America and one or two to the Colonies. Mr. Ewen crossed the Channel with a Caudron monoplane fitted with the first 45-h.p. six-cylinder Anzani motor, and in June, 1912, he flew from Paris, with Mr. Ramsay as passenger, on the first 60-h.p. six-cylinder Anzani-Caudron.

This was the first occasion on which a machine with passenger performed the Paris-London journey in 24 hours. The start was made at 6.20 a.m., and the flight was finished at 5.40 a.m. the next morning, after one stop on the French side, a second outside Walmer, and a third (for petrol) at Eastchurch.

The Hendon School.

In December, 1912, the W. H. Ewen Aviation Co., Ltd., was formed, with Mr. Ewen and Mr. Ramsay as co-partners.

As illustrating the fact that some people, at all events, were gifted with foresight in those days, I may mention that the minutes of the inaugural meeting of the company embodied a declaration to the effect that it was not expected that there would "not be any remunerative future for the firm until the impending war with Germany had broken out."

In addition to carrying on the school, during 1913 the firm supplied two Caudron seaplanes to the Admiralty. Eventually, however, Mr. Ewen left the company and Mr. A. C. Hunter became a director in his place. In January, 1914, a small workshop was started at Station Road, Hendon, where one or two machines were built, and repair work was also carried on.

Well-known Pilots.

The flying school, it may be mentioned, turned out a number of useful pilots in the pre-war period, and they included such

well-known men as Mr. Sydney Pickles, the late Major Gooden, Mr. E. Baumann, of the Ruffy-Baumann School, and Mr. L. W. F. Turner. Major Gooden, by the way, was the first man to "loop the loop" in the dark, during a display of night flying at Hendon, with an illuminated machine, a number of electric lamps being attached to the planes and accumulators, lashed in the passenger's seat.

The firm had a very successful career at Hendon in 1913, and won £350 in prizes in a single week-end.

ARCHÆOLOGY AND AEROPLANES.

When the war broke out, however, the Admiralty commandeered the Caudron sheds at the Hendon aerodrome, and the present building in Cricklewood Broadway was acquired, and the British Caudron Co., Ltd., was established.

The chairman was, and still is, Sir William Ramsay, D.C.L., LL.D., the distinguished professor and archæologist, Mr. A. M. Ramsay's father, and probably a more interesting contrast has never been known than the juxtaposition of ancient lore with an ultra-modern development in the shape of the aeroplane.

A SCOTTISH FACTORY.

Constructive work was undertaken on a larger scale than had been possible at Hendon, and in 1915 the works underwent enlargement, with still further extensions in 1916. A factory was also built at Alloa, in Scotland, of which Mr. Hunter was appointed manager. It has its own private aerodrome, and has already been extended.

The Cricklewood works are well designed and equipped, and during the war have produced Caudrons of various types, D.H.5's, Avros, and various other types, which have found their way to every part of the British front.

It may be added that Mr. Ramsay has a very able coadjutor in Mr. R. H. Simpkin, the London manager, and that the firm has enjoyed the services for three years past of Mr. R. L. Desoutter as chief testing pilot.



(*Photograph by Birkett*).

Mr. R. H. Simpkins.

chairman and managing director, with Mr. R. H. Simpkin a director, and Mr. H. C. Bathurst, secretary of both this a the British Caudron Co.

The services were retained of Mr. H. Hagens as wo manager, with a seat on the board. Mr. Hagens has been as ciated with the Anzani from the earliest days, and was, in fa a colleague of M. Anzani before he built aero-engines at all.

RAPID DEVELOPMENTS.

At the time of the trans there was a staff of 33 men o but within a few hours a s stantial Government order secured, so the staff was qu rupled, and several thous pounds' worth of new machin has been installed

SUPER-EXCELLENT WORK.

It may be said, in a w hat the venture has been ex ordinarily successful, and the is in no small measure to the high standards which Hagens set up in the instance and has maintai throughout.

Indeed, it has been placed official record in France that British Anzani motor is 25 cent. better than the Fr model, and so conscientiou Mr. Hagens in his met that he is even more rigo in his ideas of excellence the A.I.D. inspector himsel fact of which I was definitely sured on independent testim

A BENCH RECORD.

The first British, Anzani gine that was built under Hagens's direction was run three hours on the bench out a stop, and that fact self established a record for productions. Incidentally ous French Anzanis have rebuilt at the Willesden w and given better results tha newest French engines, th not better than those throughout on the spot.

The output of British en and spares is now consider and some of them have found way as far afield as Salo and to Gibraltar and other terranean stations. Acco to the Air Board, indeed, the output has been better, in pr tion to the size of the works, nor been surpassed by factory in the British Isles. Wonderful to relate, moreover a single engine has been rejected all the way through.

MANY TYPES.

The Anzani motor has enjoyed a noteworthy career i past, and has been produced in some sixteen different Its future, however, is destined to be even more intere not merely from the peculiar excellence of its manufacture the new régime, but also from the promise which is afford the experimental work which is now being carried on a British works.

THE BRITISH ANZANI ENGINE CO., LTD.

So closely allied in its personnel with the British Caudron Co. is the British Anzani Engine Co., Ltd., that one may take this opportunity of saying a few words about the latter firm.

It was formed in the autumn of 1912, as a subsidiary company of the G. A. C. group, but in March, 1916, was in more or less an insolvent condition.

Having faith in the merits of an engine which was one of the first to secure fame in aviation industry, notably by Louis Blériot's epoch-making cross-Channel performance, Mr. A. M. Ramsay decided to take over the concern, and acquired the works and plant at Scrubbs Lane, Willesden. Mr. Ramsay is the

PETROL-FILTERING.

Wire gauze for petrol filters for aircraft engines is a material which, though not prominent, is an absolute necessity for its own particular job. It must be strong, yet fine enough in the mesh to prevent the slightest particle of dust or foreign substance from entering the carburettor. It must be woven in a metal to which sediment will not cling, and it must also be woven in such a manner that its exceptionally small holes are not easily clogged.

The matter has been carefully and extensively considered, and experiments made by authorities on aero-engines in connection with the best firms of wire weavers, and a material has now been approved by the Air Board which gives a hole as fine as the old No. 200 mesh, while it is of far greater strength and durability.

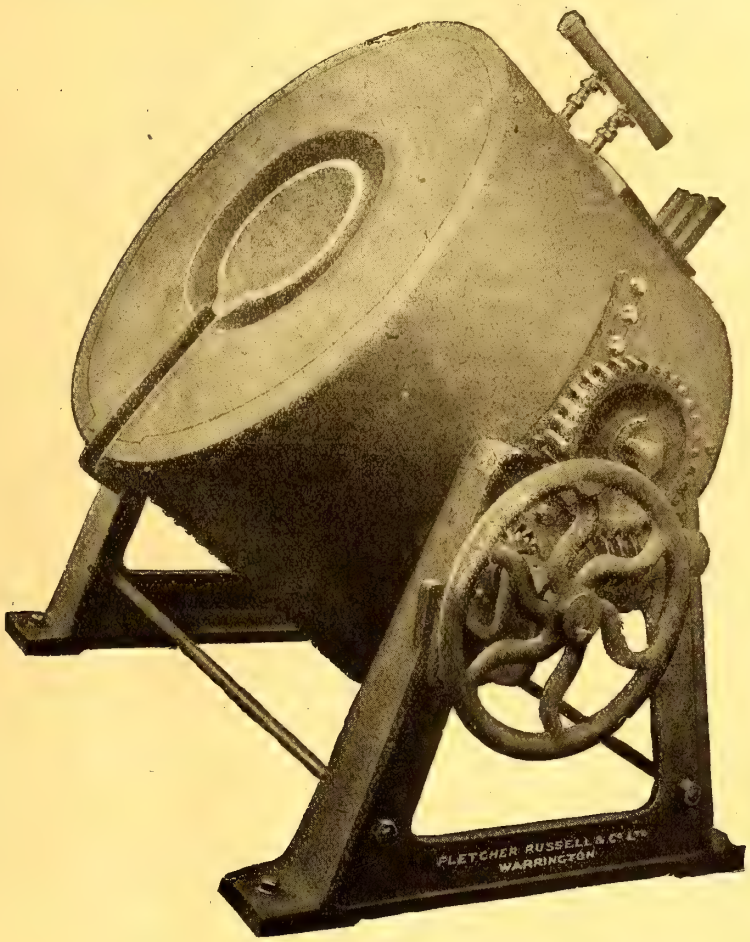
This gauze is made of a specially prepared quality of wire, the count of the "mesh" being 100 x 150, so tha number of holes to the square inch is 15,000. The wire, ever, is of such a thickness that the holes are much s than even the mesh suggest—the exact size of holes .0052 of an inch in length by .0026 of an inch in width.

This special material—now known as "Air Board Sta Petrol Gauze"—is being manufactured by N. Greening & Ltd., Warrington, who are one of the largest manufactur woven wire in the world. The London Office is at 16, bury Street, E.C.2. They have been well known for years to mining, milling and engineering experts for high-class work in this direction, and their work is exte demanded in practically all trades requiring reliable filterin screening materials.

Patent Cyclone Crucible Furnace

FOR USE WITH LOW PRESSURE GAS
—— AND AIR UNDER PRESSURE. ——

For Melting BRASS, GUN METAL, COPPER,



N 5762.

And all kinds of Hard Metal up to Melting Point of Nickel.

FLETCHER, RUSSELL & Co., Ltd.,

PALATINE WORKS, :: CENTRAL ROAD,

WARRINGTON.

The Production of Aeroplanes and their Components

(Nineteenth Instalment.)

BY STEPNEY BLAKENEY.

MAKING A SHOP PROTRACTOR.

The wings having been erected on the machine, the first thing to do will be to test the dihedral angle and the angle of incidence. For checking the dihedral angle, we shall require a protractor. However, a protractor similar to those used in the drawing office will not do, as it would not have sufficient length of base to give the correct general angle of the surface of the wings, nor is there any means of indicating what the angle is should one be used, so we must make what will be called a "shop protractor."

For this purpose we will obtain a piece of mahogany or beech, 6 ft. long by about 4 in. wide, by ½ in. thick. We will mark off the centre of this piece of wood, and, with a square, cut or mark a fine line across it. At 2½ in. either side of this centre line mark points, and then cut half the piece of wood away and halve another piece of wood into it, at right-angles. This piece of wood will be 5 in. wide by about 12 in. long.

Onto this piece of wood, when it is fixed, continue the fine line already marked on the long piece right across. This line represents the zero line of the pointer, which will be hung from a centre about ½ in. from the base (see Fig. 25).

The next thing to do is to drill a ⅛ in. hole through this centre, in the piece of wood. Then get two pieces of 12-gauge aluminium or brass, about 1 in. square, each with a ⅛ in. hole drilled through the centre, and a hole at each corner big enough to take a ¼ in. by 2 gauge brass screw. Next obtain a ⅛ in. bolt or metal thread and bolt the plates on to the piece of wood, one each side. Then place the metal plates squarely in position and screw them on.

These plates will form the bearings of the small ⅛ in. pin to which is attached the pointer. The pointer should be similar in design to a large watch-hand, about 10 in. long, of fairly heavy design at the sharp pointer end, so that the weight of it will always cause it to hang in a perpendicular position.

Before bolting on the pointer, take a large pair of finely-pointed dividers and scribe a segment of a circle on the side of the long piece of wood. On this line will be laid a piece of aluminium, about 1½ in. wide, and equal in length to about 1/6th of the circumference of a 10-in. circle, this being screwed to the piece of wood which forms the protector.

On this will be marked, in the centre with a fine pointed scriber, the zero line of the pointer. This zero line will be obtained by placing the protractor on the surface of anything handy in the shop, which has been checked with a spirit level, and is known to be truly level, on two packing blocks of equal thickness.

Then set out in ½ degrees about 2 degrees either side of the centre line carefully, and check these lines, indicating the degrees with a bevel protractor.

Having constructed the protractor, it will be as well to give it two or three coats of spirit-varnish to help to prevent it from warping, and then it may be considered ready for use.

CHECKING THE DIHEDRAL.

To check the dihedral angle of the wings of an aeroplane, the first thing to do is to consult the plans showing the general arrangement of the machine, or some other competent authority if this information is not available on the drawings.

Having obtained the drawings on which, we will assume, is the necessary information, the first thing to do is to ascertain where the line of flight traverses the body of the machine. In our case, we will assume that the top surface of the longerons of the fuselage are parallel to the line of flight.

This being the case, our work is fairly easy, because we have a ready-made base line to work from. But we must not accept this without first checking it, in case any discrepancies exist. Therefore, the longerons must be tested with straight-edges, each about 3 ft. long, placed at intervals on the top of the longerons and sighted through.

This operation will satisfy us that the fuselage is not twisted, and further, that the top surface of the longerons is straight and true.

Having satisfied ourselves on this point, the next thing to do is to level up accurately the top surface of the longerons, both longitudinally and transversely. This may mean packing up or lowering the tail of the machine, and then securing it firmly in this position with weights or any other available or suitable means; further, it may mean packing up one side of the chassis. Don't level up by putting packing under the tyre—which ought not to be fitted till later—for a tyre may deflate after the levelling is done, and so throw all your levels out. And don't pack up the wheels, because a shock-absorber may give a bit and upset your levelling.

GETTING TO WORK.

Having done this, we can commence to check the angles of the top main planes, or wings. For this purpose we shall require a pair of high steps to enable the foreman erector to place the protractor on the under side of the front part of the wing, preferably on the line of the bottom surface of the front spar; we may then expect to read any angle on the protractor between 0 deg. and 6 deg., this being the extreme dihedral angle which is likely to be wanted.

We will assume that the design of the machine calls for an angle of 3½ deg., but the angle of the wings, as erected, is only 2 deg. Adjustments must now be made.

FUNCTIONS OF BRACING WIRES.

Before being able to make these adjustments we must consider how to do so. For this reason we must study the function of the bracing wires, namely, the lift wires, the landing wires and the incidence wires. The lift wires start from the fuselage and take an upward and outward course, being attached to the underside of the top main plane by the lift plates. These wires may be termed the Inner Lift Wires, because they are in the inner bay, formed by the centre plane struts and the inner struts.

The Outer Bay Lift Wires are attached to the bottom of the inner bay struts, and run upward and outward, being attached to the lift plate at the junction underside of the top main plane with the outer struts.

The Outer Lift Wires are attached to the plates at the foot of the outer struts, and these also take an upward and outward course, being attached to the underside of the extension or overhang of the top main plane near the tip, though in some machines, on which the overhang of the upper plane is short there are none of these wires, the lift being taken by the spar itself on the cantilever principle.

Owing to the direction of attachment of these wires, it can easily be seen that when the machine commences to fly, and the top main planes commence to lift, that the effort will be transmitted through these wires unless they fail, or the bottom wing collapses.

LANDING WIRES.

The Landing Wires must next be considered. These wires run in exactly the opposite direction, as they start from the wiring plates on the underside of the centre main plane, on the top of the centre plane struts, and take a downward course, being attached to the lift plates at the bottom of the inner bay struts. The Outer Bay Landing Wires start from the wiring plates at the top of the inner bay strut and are attached to wiring plate at the bottom of the outer struts on the top of the lower wing. These wires take the strain and load of the wings when landing, or when upside down, and by the direction transmit the whole load to the centre plane struts.

SHOP PROTRACTER.

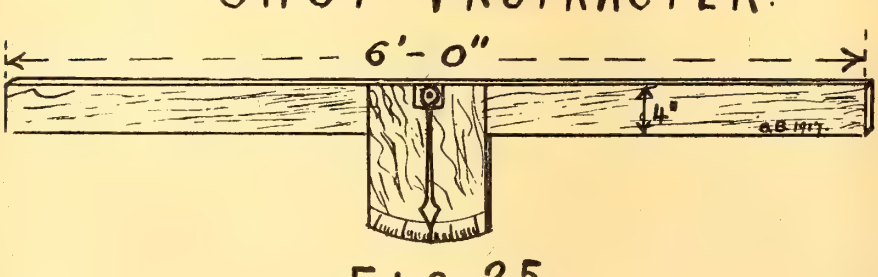


FIG. 25.

INCIDENCE WIRES.

The Incidence Wires as used, form diagonal bracing fore and aft, between the interplane struts, and according to the amount of tension and the length of each wire, control the angle of incidence, or angle of attack, of the wings.

TRUING UP.

Having briefly described the principal wires which go to form the bracing of the machine, we can now revert to the subject of truing up the machine and checking the dihedral angle and bracing up the wings to the desired angle.

(To be continued.)

THE

'Guardian Angel' Parachutes



ARE MAKING

The Prime Minister (the Man who GETS THINGS DONE) *think*;
The War Council *think*;
The Cabinet *think*;
The Prime Ministers of the Dominions *think*;
The Naval and Military Air Authorities *think*;
The Air Board *think*;
The Ministry of Munitions *think*;
The Censors *think*;
The Members of the House of Lords *think*;
The Members of the House of Commons *think*;
The Parliamentary Air Committee *think*;
The High Commissioners of the Dominions and the Agents-General of the Colonies *think*;
The Officers and Men of the Flying Services *think*;
The Mothers, Sisters, Sweethearts and Wives of our Flying Men *think*;
The Rich Men of the Empire who are anxious to help Government to win the War *think*;
The Princes and Chieftains of India *think*;
The Coroners of Great Britain and their Juries *think*;
The Designers and Makers of Aeroplanes *think*;
The Aeronautical Clubs and Societies *think*;
The Aeronautical Journals and the Public Press *think*;
The Man in the Street *think*; and

EVERYONE **THINK**, AND ASK THEMSELVES WHETHER EVERYTHING POSSIBLE IS BEING DONE TO REDUCE

AVOIDABLE WASTAGE OF OUR AIRMEN

ON THE TRAINING GROUNDS.

ALL THESE FLYING MEN ARE **WANTED.**

And if all these Distinguished Intelligences keep on *thinking* hard; *think* their best; and *ACT*; it is possible that, both here and abroad,

SOMETHING MAY BE **DONE.**

From the "DAILY MAIL" of September 3rd, 1917.

FLAMING AEROPLANE—OFFICER'S FIGHT FOR LIFE.

"Major Bannatyne, D.S.O., who fell with a burning aeroplane on Thursday, and was admitted to Cirencester Red Cross Hospital, was slightly better yesterday than the day before, but at a late hour was still in a critical condition.

"Up alone, his engine failed at 1,000 feet, and the machine, falling, took fire. The flames reaching his legs, he climbed out of his seat, and along the body of the machine to the tail. The flames caught him again and he slipped down the frame and hung by his hands. Even there the heat was almost unbearable, but just before the machine was smashed on a shed he swung clear and landed on some freshly dug ground. He is suffering from severe shock, a broken arm, and cuts about the face, head, and body.

"By the fall of a biplane at Hanworth, Middlesex, on Saturday, Lieut. Roberts was thrown into an orchard and killed."

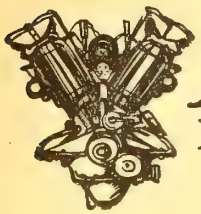
THE "GUARDIAN ANGEL" PARACHUTE (A TYPE) WILL BRING A MAN DOWN SAFELY FROM ANY HEIGHT ABOVE 200 FEET.

RELIABILITY—first. **RELIABILITY—second.** **RELIABILITY—ALL THE TIME.**

E. R. CALTHROP'S Aerial Patents, Ltd.,

ELDON STREET HOUSE, ELDON STREET, LONDON, E.C.2.

Telephones (2 lines) London Wall 3266 and 3267. Telegraphic Address—"Savemalivo-Ave-London."



AERO-MOTORS
IN KIND AND CONSTRUCTION



"SOME MOTOR."

By "QUÆSTIO."

"AMURRICA."

So far, I have never actually been to America, except to some of the outliers—out-and-out—between the equator and Bahia Blanca. That is, not to the only Amurrica which is our Al-ly. That is why I know it so well and love it accordingly, as one does a distant relation of infinite impossibility.

I began as a child by reading "Uncle Tom's Cabin," and being sorry for Uncle Tom. Now I feel sorry for the cabin. For years, too—and my own improvement—I have diligently read "Collier's Weekly," and "Page's Monthly," and all the advertisements of How-to-Become, and of the rocking chairs, the one-room-flat fittings, the auto-mo-beels, and the other sanitary plumbings. Also the "Scientific American"; and wondered which it was least or most. Once I read the "New York Herald," in Paris, where it is constructed. Once also, having the afternoon free, I had an American quick lunch as an experiment in dizziness and plank cookery.

For some few months, too, I used to sell things like Denver Prefs. and Wabashes and Milwaukees and Chesapeakes, to real Americans with square chins and keen expressions, at anything from eighty to ninety dollars, in the morning, and I remember how they used to persuade me to buy them back at seventy or eighty later on, when they had got tired of playing with them. Then on wet days, I have often watched them with great delight, strenuously cornering soap or blacking, tapioca or the English boot trade.

And how many a happy hour have I spent looking at the big map of Amurrica and wondering if the girls at Oshkosh, Wis., were anything like those at Neworleens, La., or Oswego, Ky., and if they really did have to make all those biscuits; or how far it was from each to each, so to say, that is, to the other. You know how the mind wanders.

One day I invented an improved Bronx cocktail, but forgot to protect it. Then someone else drank it. So—I really ought to know Amurrica if anybody does. That is why I refuse to go there. Amurrica made me love her, and I don't want to lose any illusions.

A BIT OF HISTORY.

There is such a lot of her; so many kinds of her that one knows and loves. There is the long-ago-and-all-forgot one, with whom you starved and tramped, shoeless and ragged, from Lexington to Jamestown, from Richmond to Old Point Comfort; the one of ambushes and freezing winter imprisonments, escapes, frays and retreats; yet ever going forward until at last one flag of thirteen glorious stars floated above you, and the last red-coat had crossed into Canada.

That other, too, who dwelt among the magnolias in an old colonial house with a Cavalier blazon over the door, somewhere between Columbus and St. Augustine. She of the sprigged muslin and ringlets, beloved of grave gentlemen in grey uniforms, whose talk was of cotton and George Carroll, pacing-horses and a young cavalry leader named Robert Edward Lee. . . . Still one sees her where she passes, smiling that she may not weep, into the shadows fragrant with the memory of a great and lovely gentlewoman.

There was the one who perished in the folds of that starry flag at the Alamo, for freedom and the star of a new State as wide as Europe. She, too, on whose breast Custer died. Also the one you saw through the mists of a great brown dreaming river that echoed the beat of paddles, day and night, among the liveoaks and cotton-woods, all along its fifteen hundred mysterious miles. And that splendid maid of The Water Front, she of the thousand schooners, and the seamen of a hundred nations, that looks across an ocean through the eyes of dawn. All they are some of my America of dreams, that are greater realities than you can imagine.

THE BELLE OF NEW YORK.

And then fifteen—no, eighteen—years ago, came another America, utterly modern and mad, made up of silver-trumpeted mirth, of Bowery dives and the Broadway's aching flame. The demure improbability that came true, and laughed at herself for three hours of glorious foolishness, every night for two whole years. She who was Ragtime. And Irresponsibility capitalised for millions. She was—the Belle of New York. Like unto her hath none been since. Another special reason for not going to see her close to.

Beside her, even the Selden and the more famous Wright Patents were sad and solemn jests. I thought She was her country's limit of inconsequent humour still: even after having seen the national aeroplanes and aeromotors. Until the other day when I read the official genesis of the one and only Liberty Motor.

THE BRONSONIA MOTOR.

Not since the dear departed days of Mr. Bronson and the "Queen of Cahmic Ahpera," not even in those of Roscoe Arbuckle have I laughed so much. So, in view of D.O.R.A., let us say it was made in Bronsonia.

Can you imagine—anywhere else than in Bronsonia—those "two best engineers who had never seen each other," being "brought together," like two strange ants on a sandhill, to rub noses and breed a new kind of super-engine? Do you see them being "figuratively locked in a room and charged with the development of an aeroplane engine"? It is an offence, I know—according to our own Invention's Board; but still not unnatural enough to deserve formal charging, and being figuratively locked up.

And then we learn that "for five days neither man left the suite of rooms engaged for them." It reminds you of a disappointing one-and-threepenny novel, doesn't it?

But "consulting engineers and draughtsmen from various sections of the country were brought to assist them." Not very kind, this, when you remember that the section of Bronsonia are alleged to be neolithic, tertiary, Old Red Sandstone, ternary, and in spots pleiocene. Even our dug-outs are not as old as that.

THE PROCESSION OF PATRIOTS.

The greatest sight of all, however, cannot have been the "two engineers alternately working a twenty-four hour shift," but must have been the procession of motor manufacturers "patriotically revealing their trade secrets." So we know the Bronsonian pilots will not have to wait until the engine comes down, as we did, before finding out what it was like inside.

Everybody concerned worked as strenuously as all this, you see, so as to have the engine built by the Fourth of July, which is the one day in the year when all Bronsonia lets off its fireworks. And they actually got it done by the day before; twenty-eight days after the drawings were started!

THE EPIC SCALE.

Nevertheless it was only done by smacking it about and spreading those drawings all over Bronsonia from east to west among twelve different factories which, it seems, already had "the tools for building the first engine, on the assumption that the drawings would be correct." Unless you can be quite sure of that, you don't make your tools, it seems. Anyway, not in the best Bronsonian motor manufacturing circles, whatever they do in effete "Yurrup."

Working in our restricted way, on a job like this, we should have had to find those twelve factories somewhere in little old London, between the Bow Road and Wembley, and Ealing and Chiswick. And it is just possible that we might have managed to do so.

AN ELEGANT SCHEME.

Since then, the rumour has been brought by Bronsonian submersible—not that I vouch for it, for fear of D.O.R.A.—that the new design is that of a four-stroke motor. I thought, after all this effort and strenuity, that the collective motor engineering talent of Bronsonia would have given us more than four strokes a hole—so to say.

But still the idea is, with this motor, that it is designed in such a way that when you want more power you take a figurative ten cylinders from the day of the month and add so many more real ones; or take away the number you first thought of and put them away to cool; or something like that. The worst of it is you can never get the exact technical facts from these Bronsonian rumours.

THE CYLINDER PROCESSION.

Only, assuming—as they did with these tools—that it is so, what I am worrying about is this: The result might leave you with eight cylinders in line. I remember, some years ago, a man who got left just that way by multiplying an otherwise excellent imitation of a four-cylinder Italian car. At Redhill they

WOODSIDE ENGINEERING COMPANY, LIMITED,

POSSILPARK, GLASGOW.

AEROPLANE TIERODS

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STREAMLINE AND ROUND SECTIONS

COMPLETE WITH

UNIVERSAL OR FORK JOINTS :

LARGE STOCKS.

PROMPT DELIVERY.

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WORKS: 1495 Douglas (2 lines.)
OFFICE: 3456 Central (3 lines.)
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Telegrams: "FUSELAGE," GLASGOW.

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50 WELLINGTON STREET,
GLASGOW.

locked him up, literally, for "a month without," the first thing he knew. Which is worse than the fate of the Bronsonian designers.

Three or four weeks ago I saw a picture in THE AEROPLANE of an unfortunate Hun who had evidently been left to nurse a similar case of eight big cylinders in line with a demultiplication gear at the tip of its long nose. And from another of the office collection I gather that the Italians—my Sohoese carries me so far—are still addicted to extravagances of this kind. Only in this case it seems to have been wilful and deliberate. And then *per aviazione* might mean an airship. Anyway, it would have a fairly hearty cam-shaft.

PROMISING PERFORMANCES.

But if, as would seem to be the normal case with the Bronsonian twenty-eight day triumph, you begin with six cylinders, and someone comes along and raises you two, for more power, so that you are left with eight, all in tandem, you cannot buckle together two four-cylinder crank shafts and bluff through. You are liable to want one—or even two—very much fatter, and a cam-shaft to match.

Then what becomes of your connecting rods? And a one-piece eight—if it can be tooled at all, once right in six wasters—is going to cost you the price of all seven. And anyway, it is not a nice "spare" to go to war with. Or if you made those eight into a V: or again make a kind of aero-motor jack-pot of it, and go a whole other six for a still longer V, you are at once called upon for another kind of crank-shaft altogether; one—according to all Bronsonian practice—with wrist-pins twice as long.

Or if not for a very differently designed set of connecting rods than those which belonged to the original six. Even if you do not have to re-space your cylinders. And in any of these little alternatives, what becomes of the standardisation which—according to that rumour—was the leading idea? You see what comes of these Fourth of July promises.

A POOR THING, BUT OUR OWN.

Of course, rumour may be all wrong. But the deduction of possibilities, as against Bronsonian strenuous effort and figurative locking-up, is a fairly clear proposition in what we know of four-stroke practice. So I should be inclined rather to back one of ours that was designed last August Bank Holiday by one man, that had its working drawings made in a week by another man, that can be standardised in units added for power, and all. Because, for one thing, it hasn't any valves, its crank-shaft is built up, and its rods fit all buildings.

And, curiously enough, it—or, rather, the full picture and recipe therefore—will probably be going to Amurrica in a week or two. Just to show her how we live here; we who don't hustle or get locked up on a motor proposition.

THE HUN SYSTEM.

After all, the wily Hun does begin to know a little about aero-motors. Ask any lad who has tried to chase 'em and he'll tell you. Or ask any of our real mechanics at home who have taken Hun engines to pieces and put them together again, mostly, I believe, for exhibition to a public which wouldn't know whether the motor had any inside or not, and would believe that a motor-bike engine was a 260 Merc. if it was labelled that way. And the Hun doesn't get his power by multiplying his cylinders. He started off with 4-cylinder 75 h.p.'s, and then took to 6-cylinder 100 h.p.'s, which were actually the Dieppe Circuit racing car engines. Then he worked up to 6-cylinder 150 h.p.'s, instead of doubling the four cylinders of his 75's.

After that he screwed 175 h.p. out of the same six cylinders. And then he made the mistake of sticking two cylinders on and trying to make the engine give 240 h.p.—which it did under protest, signifying same in the usual manner.

Protest having been duly accepted, the Hun went back to his six cylinders, and if you will take a backward glimpse to page 1,012 of THE AEROPLANE, October 10th, 1917, you will find: "It is confidently expected that eventually all the machines of the Army squadron type will be fitted with the new 6-cylinder, 260 h.p., Mercédès engine, which is, though but slightly heavier, much more reliable than the 8-cylinder, 240 h.p., model." So by decreasing the number of his cylinders the Hun gets increased reliability and twenty extra horse-power for a very little extra weight.

But if he had stuck to his original cylinders of the 75 h.p. and screwed them up to 20 h.p. apiece, he would now be getting somewhere about 240 h.p. out of twelve cylinders and a heap of extra weight therewith. So that's that for your multiplication of cylinders. As it is he is getting something like 45 h.p. per cylinder out of the simplest engine in the world as a natural process of evolution. And it isn't a stunt resulting from forced cultivation by any locking-up, hot-house process. It is just a plain workshop job. Which is what ought to appeal to the sane part of Amurrica, even if it isn't humorous enough for Bronsonia.

AMERICA AND THE WAR.

There is something very childlike and bland in the curious demonstrations of patriotism with which the Americans love to adorn the sterner duties of war.

On September 22nd, a Caproni triplane and two Italian "battleplanes of great speed" flew from Newport News to Washington in something under two hours, a distance of 120 miles, and proceeded to "bombard" the White House with bouquets of flowers.

Captain Emilio Resnati piloted the big machine, and carried as passengers a representative collection of Government officials, namely Dr. Stratton, Director of the U.S. Bureau of Standards, W. F. Durand, Chairman of the National Advisory Committee on Aeronautics, Mr. W. B. Stout, of the International Aircraft and Centralization Board, Mr. S. J. Kubel, map expert of the United States Geological Survey, to say nothing of a spare Italian captain and four mechanics.

One of the smaller machines was piloted by Lieut. Ballerini, with Lieut. Franklin K. Lane, jun., U.S.R., son of the Secretary of the Interior, as passenger.

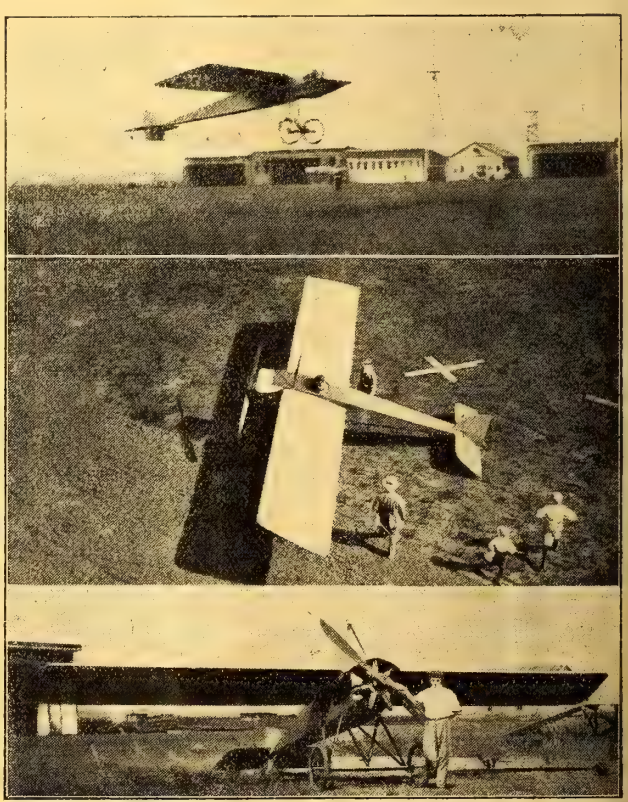
Everyone was very pleased, and some pretty speeches were made; but one cannot refrain from thinking that the number of man hours wasted by the leading figures in the show and the inevitable crowd of spectators would have constructed quite a number of "Liberty" engines or aeroplanes.

* * *

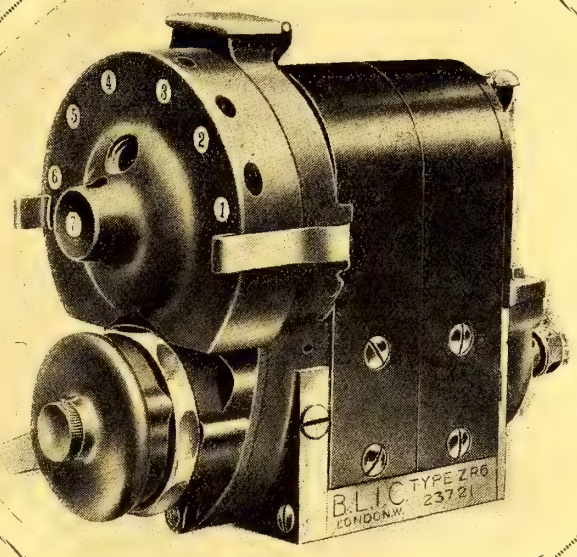
Captain Resnati has put the world's altitude record for twelve passengers up to 17,000 ft. in the course of a fifty-six minute flight at Norfolk, V.

MR. WALTER BROCK AT WORK.

The older readers of THE AEROPLANE will be pleased to hear that Mr. Walter L. Brock, whose all-round sportsmanship and constant good flying in 1913 and 1914 made him so many friends, is still carrying on flying in the United States. He is now consulting engineer to the Aero Club of Illinois, and is undertaking experimental work on his own account. He has constructed the neat Morane type monoplane illustrated, which flies extremely well with a 50-h.p. Gnôme engine, and he is at present undertaking exhibition flying to raise money for further experiments. Of late he has been giving daily exhibitions of flying and looping the loop at the Chicago Exhibition, where his skill has created a very favourable impression. The erstwhile habitués of Hendon will wish him continued success and a return some day to England.



Mr. Walter Brock, late of Hendon, is here seen flying recently at the Chicago Exposition. It will be seen that he remains faithful to the Morane-type monoplane, for trick-flying, though doubtless for his experimental work he uses more up-to-date machines.



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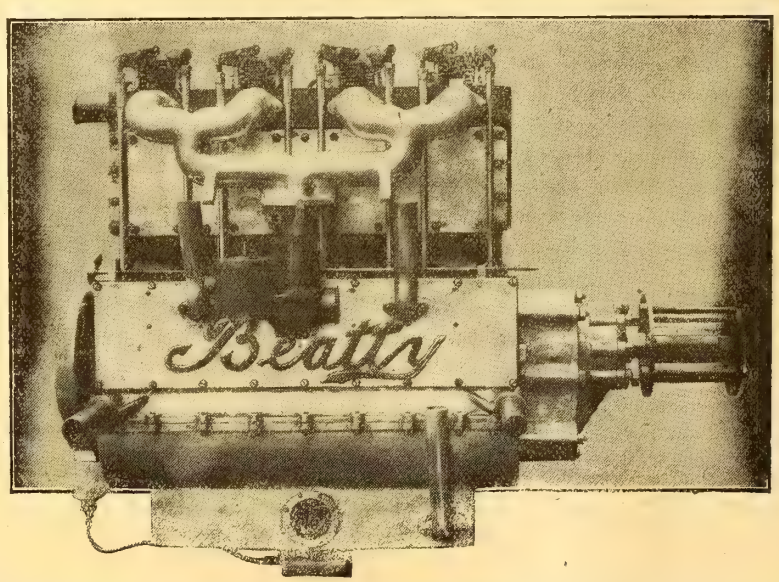
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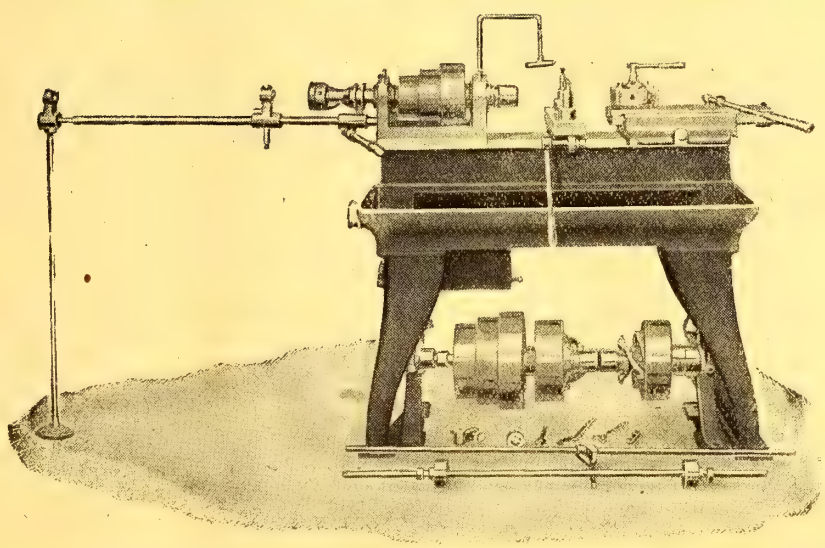
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Lang Propeller, Ltd., Weybridge. "Aerosticks, Weybridge." Weybridge 520-521.
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich" Norwich 482 (4 lines).
Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 291, Leeds.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

Rigging for Aircraft—

Cradock, G., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466.

Safety Belts—

Enfield 520 (6 lines).
Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.

Sand and Die Castings—

Coan, R. W., 219, Goswell Road, London, E.C. "Krankases, Isling, London." City 3846.

Scientific Instruments—

The Foster Instrument Co., Letchworth, Herts. "Instrument, Leeds." Chapeltown 474.

Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay, 345 (3 lines).
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.
Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton." Southampton 1337.

Seats for Aeroplanes—

Bowser, E., Art Cane Works, 50 Park Lane, Leeds. Central 3437.

Shackles—

The British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow. "Golshel, Hounslow." Hounslow 254.

Sheet Metal Pressings—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.
W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk, Bham." Central 550.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 497 Birmingham.
Nicholls & Lewis, Ltd., 16, Princep Street, Birmingham. "Colpressed, Birmingham." Central 7188.
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

Sheet Metal Work—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.

Shock Absorbers (Elastic Cord)—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough."

Sparking Plugs—

Peterborough 128.
Forward Motor Co., Summer Row, Birmingham Central 6259.
Hobson Manufacturing Co., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.
Lodge Sparking Plug Co., Ltd., Rugby. "Igniter, Rugby." Rugby 235.
Ripault, Leo, & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758.

Springs—

Dart Spring Co., West Bromwich. "Dart, West Bromwich." West Bromwich 322.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Steel—

Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237.
Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham." Smithwick 224.

Steel Tension Wires—

Cradock, G., & Co., Ltd., Wakefield. "Cradock, Wakefield." Wakefield 466 (3 lines).

Steel Tubes for Aeroplanes—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Taper Pins—

Mountford, Fredk. (Birmingham), Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262.

Tapes and Smallwares—

MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.
James North Hardy & Son, Ltd., 54, Portland Street, Manchester. "Hardson, Manchester." Central 6471.

Timber—

Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Entikosil, Vic, London." Victoria 5073, 4210.
Brown, R. F., & F. W., Wollaton Saw Mills, near Nottingham. "Brown's Saw Mills, Wollaton." Nottingham 1526.
J. Owen & Sons, Ltd., 199a, Borough High Street, S.E.1. "Bucheron, London." Hop 3811 (2 lines).

Time Recorders—

Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310.

Turnbuckles—

Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

Tyres and Wheels—

The Beldam Tyre Co., Ltd., Brentford, Middlesex. "Beldam Tyres, Brentford." Ealing 125-126.
The Palmer Tyre, Ltd., Shaftesbury Avenue. "Tyricord, Weskent." Gerrard 1214 (4 lines).

Varnishes—

Clark, R. Ingham, & Co., Caxton House, S.W.1. "Pearline, Vic, London." Victoria 2023.
Harland, W., & Son, Merton, London, S.W.19. "Harland, Wimbledon 45." Wimbledon 45 and 1395.
Naylor Bros., Ltd., Southall, Middlesex. "Naylor, Southall." Southall 30.

Washers—

Herbert Terry & Sons, Ltd. Redditch. "Springs, Redditch." Redditch 61.

Watchmakers and Jewellers (Silver Models)—

Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 9091 (3 lines).

Welding Repairs—

Barimar, Ltd., 10, Poland Street, W.1. "Barquamar, Reg, London." Gerrard 8173.

Wind Shields—

Auster, Ltd., 133, Long Acre, W.C. "Winflector, London." Regent 5910.
London Label Co., Ltd., Hadley Works, Beckton Road, E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Wires and Cables (Aeroplanes)—

Bruntons, Musselburgh, Scotland. "Wiremill, Musselburgh." Musselburgh 28.
Cradock, Geo., & Co., Ltd., Wakefield. "Cradock, Wakefield." Wakefield 466 (3 lines).

Wirework—

Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Woodworking Machinery—

Robinson, Thomas, & Son, Ltd., Railway Works, Rochdale. "Robinson, Rochdale." Rochdale 467.
Sagar, J., & Co., Ltd., Halifax. "Sawtooth, Halifax." Halifax 136.
Wadkin & Co., Leicester. "Woodworker, Leicester." Leicester 2614.

THE AEROPLANE BUYERS' GUIDE.

Acetylene Welding Plant—
Imperial Light, Ltd., 123, Victoria St., S.W. "Edibris, Phone, London." Victoria 3540.

Aeroplane Manufacturers—
Aircraft Manufacturing Co., Ltd., Hendon. "Airmanship, Hyde, London." Kingsbury 180.
Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne." Gosforth 500.
Blackburn Aeroplane & Motor Co., Olympia, Leeds "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.
British Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol" Bristol 3066.
British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudroplan, Crickle, London." Hampstead 5551.
Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6. Hampstead 4728.
Davidson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1143-1145
Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1176.
Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 120.
Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophid, Crickle, London." Hampstead 7420.
Mann, Egerton & Co., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
Martinsyde, Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge." Woking 331; Byfleet 171.
National Aircraft Co., Ltd., 15, Hackney Road, N.E.2. London Wall 6725.
"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London." Willesden 2455.
Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48.
The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis, London." Putney 2240-2241.
Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester." City 8530-8531, Manchester.
Sage, Frederick & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes." Cowes 193.
Short Bros., Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London." Regent 378.
Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston." Kingston 744.
Standard Aircraft Manufacturing Co., Effingham House, Arundel Street, W.C.2. "Gunsigrush, Estrand, London." City 89.
Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickerfyta, Knights, London." Kensington 6810.
Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.
White, J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes." Cowes 3.

Airships—
Airships, Ltd., High Street, Merton. Wimbledon 1314.
Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, Phone, London." Regent 378.

Aluminium Castings—
Coan, R. W., 219, Goswell Road, London, E.C.1 "Krankases, Isling, London." City 3846.

Aluminium Presswork (Stampings, Etc.)—
Willans & Robinson, Ltd., Victoria Works, Rugby. "Willans, Rugby." Rugby 112 (3 lines).

Bearings (Etonia Cast Phosphor Bronze)—
Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3927.

Brass Sheets for Tipping Propellers—
Lucraft, H., & Co., 147, Fenchurch Street, London, E.C.3. "Lucraftia, London." Avenue 2217.
Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 695, 996, and 506.

Buildings—
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.
Fairby Construction Co., Ltd., 117, Victoria Street, S.W.1. "Bizfibild, London." Victoria 8868.
Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313
Ruberry Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
The Wilfley Co., Ltd., Salisbury House, London Wall, E.C.2. "Wrathless, London." City 2681-2

Cable Coverings and Cable Controls—
Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Capstan Work—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223

Carburettors—
Hobson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.

Castings—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Lucraft, H., & Co., 147, Fenchurch Street, London, E.C.3. "Lucraftia, London." Avenue 2217.

Castings (Aluminium, Brass, Bronze, Machined or Rough)—
Coan, R. W., 219, Goswell Road, London, E.C.1. "Krankases, Isling, London." City 3846.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Willans & Robinson, Ltd., Victoria Works, Rugby. "Willans, Rugby." Rugby 112 (3 lines).

Cellon—
Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawb, London." London Wall 5359-3622.

Celluloid (Non-Flam.)—
Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7.
Cowper-Coles Manufacturing Co., Scherer Chambers, Thames. Surbiton 3.

Clothing—
Burberry's, Ltd., Haymarket, S.W.1. Regent 2165.
Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6.
Hazel & Co., 4, Princes Street, Hanover Square, W.1. Mayfair 4071-2.
Robinson & Cleaver, Ltd., Regent Street, London, W.1. Gerrard 1070.

Component Parts—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (4 lines).
B. D. V. Aircraft Spares, Syon Chambers, 162, Kew Road, Richmond, Surrey. "Aeros, Richmond." Richmond 1681.
Central Aircraft Co., Palmerston Works, High Rd., Kilburn, N.W.6. Hampstead, 4728.
The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aerracraons, Canning, London." East 1300.
The Osborne Aircraft Co., Ltd., Whin Hill, Greenock, Scotland. "Cordage, Greenock." Greenock 618.

Cords, Tapes, and Threads—
MacLennan, J., & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.

Dopes—
British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312.
British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellulate, London." Regent 4046.
Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawb, London." London Wall 5359-3622.
Clark, Robert, Ingham & Co., Ltd., Caxton House, S.W.1. "Pearline, Vic, London." Victoria 2023.

Electrical Accessories—
Mann, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston road, London." Museum 70.
Premier Electric Heaters, Ltd., 258, 259, and 360, Bradford Street, Birmingham. "Fahrenheit, Birmingham." Midland 981.

Electric Cables—
E. Kalker & Co., Coventry. "Kalker, Coventry." Coventry 24x.

Electric Lighting and Power—
E. Stanley Fardon, A.M.I.E.E., 67, Mosley Street, Manchester.

Engines and Parts—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford. "Engineering, Bedford." Bedford 77.
Arrol-Johnston, Ltd., Dumfries. "Arrol, Dumfries." Dumfries 281-282.
The Beatty School of Flying, Ltd., Lee Green Highway, Cricklewood, N.W.2. Hampstead 1041.
Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London." Gerrard 1070.
Dudbridge Iron Works, Ltd. (Sopwith Aviation Co., Ltd.), Victoria Street, London S.W.1. "Sopwithflight, Vic, London." Victoria 2680.
Gordon Watney & Co., Ltd., Weybridge. "Mercedès, Weybridge." Weybridge 550 (3 lines).
Green Engine Co., Ltd., Twickenham. Richmond 1058.
Gwynnes, Ltd., Hammersmith Iron Works, Hammersmith, W. "Gwynne, Hammersmith." Hammersmith 1.
Rolls-Royce, Ltd., 14 and 15, Conduit St., W. "Rolhead, London." Gerrard 1634.
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.
Sturtevant, B. F., Co., Ltd., Hyde Park, London, U.S.A. Regent 1181.
Sunbeam Motor Car Co., Ltd., Wolverhampton. "Moodfield, Wolverhampton." Wolverhampton 490.
The Gnôme & Le Rhône Engine Co., Ltd., 47, Victoria Street, S.W. "Gnomerhône, London." Walthamstow 958 (3 lines).
Willans & Robinson, Ltd., Victoria Works, Rugby. "Willans, Rugby." Rugby 112 (3 lines).

Flexible Shafts—
Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Flying Schools—
Bournemouth Aviation Co., Ltd., Ticket Office, Bournemouth. "Etches, Winton" Bournemouth 270.
Cambridge School of Flying & Aeroplane Co., Ltd., 30b, St. Andrews Street, Cambridge.

Furniture (Office)—
Cooke's (Finsbury), Ltd., Finsbury Pavement House, London, E.C.2. London Wall 573 and 629.

Galvanising—
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.
Cowper-Coles Manufacturing Co., Scherer Chambers, Thames. Surbiton 3.

Gears—
Moss Gear Co., Ltd., Thomas Street, Aston, Birmingham. "Mossgear, Birmingham." East 40.

Glue—
Improved Liquid Glues Co., Ltd., 61, Heritage Street, E. (Croid.). "Croidite, London." Avenue 1677.
Wapp, London." Mayfair 4071-2.
Mendine Co., 8, Arthur Street, E.C. Bank 5938.

Goggles—
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Heating and Ventilating—
Comyn, Ching & Co., Ltd., Castle Street, Long Acre, W.C. "Comyn, Ching, London." Gerrard 1074.
Chas. P. Kinnell & Co., Ltd., 65, 1, Southwark Street, London, S.E.1. "Kinnell, London." Hop 375 (3 lines).

Instruments—
British Wright Co., Ltd., 33, Chancery Lane, W.C.2. Holborn 1

Instruments (Scientific, &c.)—
Short & Mason, Ltd., Walthamstow, E.17. "Mondonald, Walthamstow." "Aneroid, Walthamstow." Walthamstow 40.

Machine Tools—
Brewster & Co., 11, Queen Victoria Street, E.C.4. "Circumfuse, Cannon, London." City 6

Magneto Driving Pieces—
Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Magnetos—
The M-L Magneto Syndicate, Ltd., Magneto Works, Coventry. "Corlton, Coventry." Coventry 2

The British Lighting & Ignition Co., Ltd., 204, Tottenham Court Road, W.1. "Bimag, Phone, London." Museum 6

Metal Manufacturers—
Clifford, Chas., & Sons, Ltd., Birmingham. "Clifford, Birmingham." Central 6

Metals in General—
Samuel Mercer & Co., 196, Upper Thames Street, E.C.4. "Reconciled, London." Central 2

Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 695, 996,

Metal Parts and Fittings—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
Aircraft Supplies Co., Ltd., 125, Long Acre, W.C. "Upcast, Rand, London." Gerrard 276.
Armour & Harrison, Ltd., Hythe Road, Willesden Junction. Willesden 2267.
Bayliss, Jones & Bayliss, Ltd., Wolverhampton. "Bayliss, Wolverhampton" (Bolts and Nuts). "Bayliss, Wolverhampton" (Handicraft). Wolverhampton 1041.
The Birmingham Guild, Ltd., 45, Gt. Charles Street, Birmingham. "Handicraft." Central 3705.
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
The British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow, London. "Golshel, Hounslow." Hounslow 254.
Brown Bros., Ltd., 157, Cleveland Street, London, W.1. "Installing, Euston." Museum 70.
Bunnell, Fredk., Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." Kings Norton 261.
Burbery, Owen, & Co., Ltd., Darlaston. "Roofs, Darlaston." Darlaston 87.
Burton, Joseph, & Sons, Ltd., Wellington, Salop. "Sankey, Wellington, Salop." Wellington (Salop) 66.
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.
The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aerracraons, Canning, London." East 1300.
Chown Bros., Ltd., Bradley, Bilston. "Chown, Bilston." Bilston 10.
Cooke Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10.

Metal Shearing Tools—
Dalesperry, Smith, & Co., Ltd., Tangent Works, Keynsham, near Bristol. "Insperry, Salford." Keynsham 21.

Metal Spinnings—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Nuts Bolts—
Barrow Bros., Zora Works, Hildreth Street, Battersea, S.W. Battersea 415.
Burbery, Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

Oddlesaneous—
Coleman, D., & Son, Ltd. (Roofs), Belfast. "Anderson, Belfast." Belfast 4633-4034-4035.
Crabtree Glass Co., Ltd., 76, Turnmill Street, E.C. Central 3731.
Dorman Wire, Ltd., Willesden Junction, Silverdale, Harlesden, London." Willesden 2400 (3 lines).
Dunn Bros., Ltd., Great Eastern Street, E.C. "Imbrowned, Bethrood, London." London Wall 6300.
Electric Manufacturing Co., Ltd., 61½, Fore Street, London, E.C.2. Labels in Metal, Paper, Fabric, etc.
Ernest Fred Co., Ltd., Chapel-en-le-Frith. "Fredcrabtree, Birmingham." Central 793.
Fore Manufacturing Co., Ltd., 221, Fore Street, London, E.C.2. City 9558.
Gummed Label Co., Ltd., Harley Works, Beckton Road E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.
Hobson, J., & Co., 30, Newgate Street, London, E.C., and at Glasgow. Tapes, Cords and Webbing. City 3115.

Motor Cars—
Arrol-Johnston, Ltd., Dumfries. "Morar, Dumfries." Dumfries 281-282.
Bayliss, Jones & Bayliss, Ltd., 379/381, Euston Road, London, N.W.1. "Manegecar, Euston, London." Museum 70.
Sunbeam Motor Car Co., Coventry. "Flywheel, Coventry." Coventry 530 (4 lines).

Name Plates and Labels—
Electric Manufacturing Co., Ltd., 61½, Fore Street, London, E.C.2.
Fredk. Metal Engraving Co., Chatsworth Works, Worthing. "Clegg Worthing."

Observation Panels—
Crabtree Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Parachutes—
Calthrop's Aerial Patents, Ltd., Eldon House, Eldon Street, London, E.C. "Calthrop, London." Ave, London." London Wall 3266-3267.

Patent Agents—
Boult Agency, 165, Queen Victoria Street, E.C. Central 682.
Cruttwell & Co., 27, Chancery Lane, E.C.4. Central 332.
Cruttwell & Co., 38, Chancery Lane, E.C. Central 1763.

Petrol Storage (Bulk)—
Shell Co. (The Hydraulic System), Shell House, Kingsway, London, W.C.2. "Shellonian, London." Gerrard 2220.

Piston Rings—
British Chuck & Piston Ring Co., Coventry. "Rings, Coventry." Coventry 723.

Power Presses and Dies—
Bliss, E. W., & Co., 23, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon, London." Hop 4330.

Presswork—
Ruberry Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
Terry, Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.
Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.
Integral Propeller Co., Ltd. "Aviprop, Hyde, London." Hendon 9, Kingsbury 104.
Lang Propeller, Ltd., Weybridge. "Aerosticks, Weybridge." Weybridge 520-521.
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich" Norwich 482 (4 lines).
Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 291, Leeds.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

Rigging for Aircraft—
Cradock, G., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 460.

Safety Belts—
Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.

Sand and Die Castings—
Coan, R. W., 219, Goswell Road, London, E.C. "Krankases, Isling, London." City 3846.

Scientific Instruments—
The Foster Instrument Co., Letchworth, Herts. "Instrument, Leeds." Chapeltown 474.

Seaplane Manufacturers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay, 345 (3 lines).
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.
Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton." Southampton 1337.

Seats for Aeroplanes—
Bowser, E., Art Cane Works, 50 Park Lane, Leeds. Central 3437.

Shackles—
The British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow. "Golshel, Hounslow." Hounslow 254.

Sheet Metal Pressings—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345. London, 345.
W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk, Bham." Central 550.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 407 Birmingham.
Nicholls & Lewis, Ltd., 16, Princep Street, Birmingham. "Colpressed, Birmingham." Central 188.
Ruberry Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

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Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough."

Sparking Plugs—
Forward Motor Co., Summer Row, Birmingham Central 6259.
Hobson Manufacturing Co., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.
Lodge Sparking Plug Co., Ltd., Rugby. "Igniter, Rugby." Rugby 235.
Ripault, Leo, & Co., Ltd. (Oleo Plugs), 642, Pelland Street, W.1. "Ripault, Reg, London." Gerrard 7758.

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Dart Spring Co., West Bromwich. "Dart, West Bromwich." West Bromwich 322.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Steel—
Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237.
Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham." Smithwick 324.

Steel Tension Wires—
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Naylor Bros., Ltd., Southall, Middlesex. "Naylor, Southall." Southall 30.

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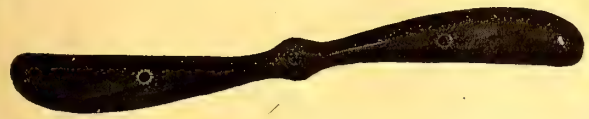
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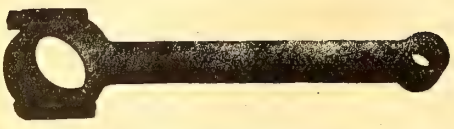
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THE "HOWARD" SLIDE OR CUFF VALVE.

The accompanying drawings and description of the latest overhead application of the "Howard" patent slide valve to aero engines are furnished by Mr. H. J. Howard, the inventor of this system of valve, which is used in the Wessex engines. The system will doubtless be of interest to many manufacturers :—

To simplify matters, water outlets, induction and exhaust pipes are not shown, and can very well be left to individual taste.

The various sections are arranged as follows :—

In Fig. 1, *a* is an outside elevation showing the complete height of the valve gear above the piston.

b is a vertical axial section with valve ring and actuation removed to show the arrangement of ports; the highest point reached by the piston is also shown dotted.

c is a complete vertical section.

In Fig. 2, *d* is a horizontal section through the water floor between the ports; *e* is a horizontal section through the top or exhaust ports. This gives a good idea of the large and free gas passages.

f is a top plan showing complete actuation, with cover removed from the cam shaft casing or trough.

Fig. 3 is a vertical cross-section showing the cylinder barrel inserted into the extended crank case, which, with the aid of a soft ring in the lower floor, forms the water jacket, and incidentally makes a light and stiff construction far cheaper than the old block formation.

This method enables the cylinders to be made of a harder iron, and should a cylinder burst or develop a flaw, it is an easy matter to insert a new barrel, whereas with the block casting the whole lot would be scrapped. If desired, steel barrels can be used. A further advantage is the even concentric thickness of the cylinder barrels, a very difficult thing to obtain with the bloc formation.

In the present six-cylinder en bloc aero engine the cylinders have an unbroken bore from end to end, a steel head closing in the top, a thin Hallite or Bellite washer forming the explosion joint. This joint has never given any trouble, although the heads were by no means deep in section. This new design, by lowering the explosion joint to the lowest extremity of the valve's travel, makes a very deep and stiff head, making doubly sure of the explosion joint.

Each head is an easily standardised unit, complete with its valve and actuation bridge; the whole is an easily handled block which can be readily removed to the bench for cleaning or replacements.

The smallness of the casting makes it an easy machining job, using the spring pocket for a trueing spigot to enter. There is nothing to prevent aluminium being used for this head with a cast-iron tube inserted for the valve surface.

Other improvements over the earlier design are :—

A central balanced actuation, with a centrally placed spring.

A straight operating lever, displacing the old crank fork arm, the springiness of which prevented 3,000 revolutions being reached.

By placing the inlet ports below the exhaust the induction pipe is not overheated, and the carburettor can be placed on the side of the engine, while the exhaust heat passes the better away—and upwards.

The cam shaft trough is of a circular or tubular shape, bored right through, and open on top between the bearings, which are in two halves, slipped endwise along the shaft into the straps, which occur opposite each holding-down boss, the whole being firmly held to the heads by the nuts which hold the heads on.

This valve system, first patented in 1908, may be regarded as the pioneer of this type of valve, being the first to use a split ring for both exhaust and inlet, the first to use a cam operation giving a pause to the valve during pressure periods, and the first to utilise the ring of oil brought up by the top piston ring to lubricate such a valve by merely overlapping their paths of travel.

Later patents have been taken out further covering this self-oiling quality, and to increase the distance this oil is pushed over the working face, an obturator type of top piston ring is used as shown dotted in *b*, Fig. 1. By bevelling off the lower edge of the head a shoulder is formed in which oil can collect as a reservoir, and thus get well behind the valve on its descent. When the top port is used for exhaust a better chance is given for the oil to travel across the valve surface than is the case with the ports reversed.

Whether the top or the bottom ports are used for exhaust makes no difference, for in neither case can the valve touch the piston, as it has to return to its neutral position at each in centre of the piston, where it just clears the top piston ring, by a couple of millimeters.

A movement of ten degrees of the crank shaft is all that is required to make the transfer between exhaust closing and inlet opening. With ports of such large area niceties of valve timing disappear, and make very little difference as the charge gets in so very freely and by reason of the annular ports sufficient turbulance takes place by the converging charge to ensure rapid

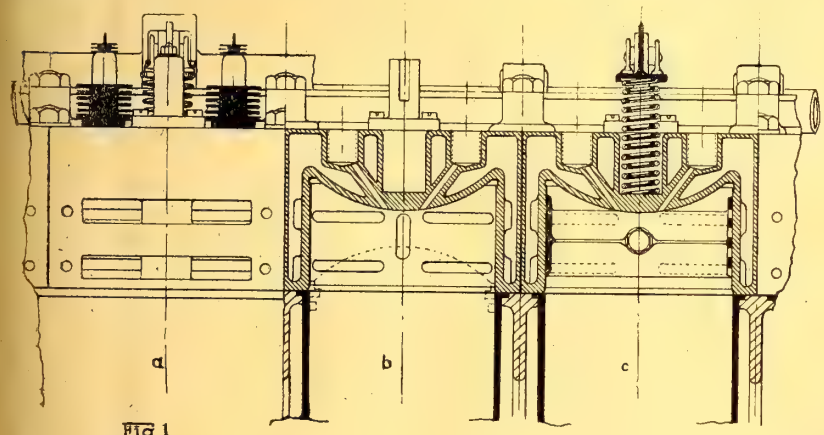


Fig 1

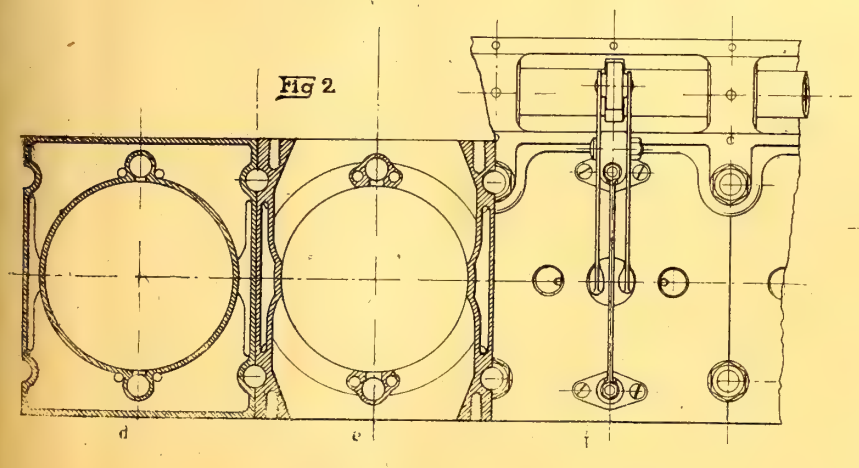


Fig 2

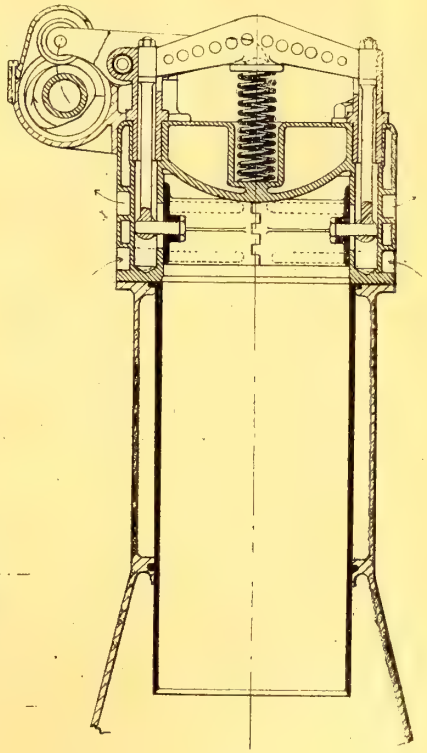


Fig 3

The "HOWARD" SLIDE VALVE
Overhead Operation. 105. bore
A valve movement of 8.7 gives 2·5 sq in. of port op

combustion, conversely the radial divergence of the exhaust greatly helps to get these products away quickly.

These two points, coupled with the potent fact that the combustion chamber is evenly cooled, with no hot spots or poppet valve heads, give any engine fitted with this valve such high efficiency, and low fuel consumption, the latter being 20 per cent. better than the best poppet valve engines in existence, the average petrol consumption with this valve being 0.483 lbs. per b.h.p. hour. The oil consumption being between 0.02 and 0.04 pts. per b.h.p. hour.

By reason of the short stroke and ample wearing surface of this valve, its life should easily be greater than the rest of the engine. As it is not moved when the compression and explosion pressures are on it, and as it is kept constantly lubricated by passing fresh oil across its working surface.

A point possessed by no poppet valve engine is the fact that continued use improves this valve, burnishing the working faces to a better fit. How different with the poppet valve, when there are 12 cylinders and four valves per cylinder to be constantly ground in, to maintain its former efficiency, or rather inefficiency.

By reason of this valve springing to, and being lightly pressed to the cylinder wall, it practically forms part of the same, and, therefore, gets but a few degrees hotter than the cylinder wall, in fact, a pale straw on the inner surface and a purple or blue on the trunnion pin bosses is all discoloration ever observed.

This slide or cuff valve must not be confounded with the sleeve valve, for there is nothing in common, except silent action, between the two systems. The difference in the weights of the reciprocating valve parts being as 40 to 1. Neither is the piston insulated from the cylinder wall; it can, therefore, be kept reasonably cool. One of the great advantages of this system is its simplicity of manufacture, as the complete head with its valve can be a standardised unit, easily and cheaply replaced, if necessary, by any novice, in a very short time. Nor is there any reason why this valve should not supersede the poppet valve entirely and thus increase the efficiency and decrease the fuel consumption of many otherwise very excellent engines, its use is not limited to aero-engines, but will give equally efficient service for agricultural use as for the highest class car engine.

The Company owning the patents will be pleased to assist manufacturers wishing to incorporate this system in their present or post-war engines, and the inventor will gladly place his long experience at the disposal of licencees.

Lieut.-Colonel Bagnall-Wild on Inspection.

In his presidential address to the Institution of Automobile Engineers, Lieut.-Colonel R. K. Bagnall-Wild discussed the subject of "Inspection."

In considering why inspection is necessary he thought a comparison of the various classes of men engaged in production would be helpful. Apart from labourers, there are in average engineering works a majority of workers, male and female, who, although graded as mechanics, are practically repetition workers. It is not necessary for them to have the training and knowledge of the higher grade engineer, and the more progress is made with the introduction of automatic machines and a general system of repetition work the more will it be possible to use less highly skilled labour.

Again, the engineer puts forward a design and the drawing office works it out in detail. The drawings should be reproduced as shop drawings, showing the various processes for each part, and clearly laying down the limits which are to be worked to and the material from which the parts are to be made. The producer, i.e., the mechanic, cannot be expected to have the knowledge required to determine whether the material is in accordance with the specification, and if the material be slightly above or below the limits of the specification it is impossible for him to determine whether it is safe to employ it.

The designer, however, may justly be entitled to expect that a finished article is in accordance with his wishes, else he can hardly be held responsible for its correct functioning. Some department must, therefore, exist to take this responsibility, and an inspection branch is essential for the purpose.

The Production Aspect.

From the machine-shop point of view the workman desires output because it gives him more money; the foreman desires it because therein lies his chance of promotion; the production manager may thus be said to be the enemy of the designer. The directors and shareholders of a company must therefore protect themselves from bad workmanship; the reputation of the firm must be upheld, and the finished article must be as good as possible, having due regard to prime cost. Inspection alone will ensure this.

Again, inspection of a finished part is essential before assembly of all the parts into the whole. A well-organised shop with a proper system of inspection results in a saving of time and money in erection. In many cases where the viewing of the output of the machine shop is slack, or is lacking, erection becomes practically hand-fitting, interchangeability is entirely lost, and spare parts are impossible to fit.

An organisation is, therefore, required on the lines of a small inspection staff to deal with all goods in the receiving or inward store (nothing being allowed to go forward to the machine shop unless it bears the stamp of tha tinspection branch), and a complete system of process inspection in the machine shop and in a view room between the machine shop and what may be called the erection or main store.

Interests of the Purchaser.

The average purchaser is content to take a firm's guarantee that the goods supplied are in accordance with the order. He usually protects himself by seeing that the goods are externally correct, and that they function reasonably in accordance with his requirements. Government Departments go a good deal further. They are responsible for public funds, and have to ensure that value is obtained for the money expended. In many cases the requirements may be of a special naval or military nature of which the contractor has little or no knowledge.

Inspection from this point of view may be divided into two main classes—final inspection and detailed process inspection. The former is possible in many cases—for example, in the purchase of a lathe. Detail inspection is essential where the nature of the material is of vital importance in the functioning of the whole, as when the factor of safety is low.

Detailed inspection during manufacture should not be necessary when a firm has a good view room of its own. In this case material must be inspected on or before entering the works. Steel should be inspected where it is made, at the steel works or the rolling mills. Any faulty material is then at once thrown out, and the steelmaker has the opportunity of tracing the trouble to its source. Freight to and from the steelmakers' and contractors' works is saved; in fact, a double journey is obviated, as faulty material will probably be returned to the maker by the contractor.

The next place where the inspection department picks up the thread is where the parts have left the machine shop. Here the amount of inspection necessary depends entirely upon the firm. In the case of a good maker who is erecting, say, 80 per cent. of his products into finished machines and sending away the remainder as spares, it would probably be necessary for the Government inspector to inspect only the spares, the machines themselves being inspected after erection. A running test, if one is required, is carried out under the supervision of an inspector, and at its conclusion a careful examination is made to see that no parts are unduly worn or fail in their action.

Women Inspectors.

Women are quick to learn elementary details; thus they can be taught to use micrometers intelligently, and easily manage the "go" and "not go" gauge. But with such a training they cannot be given discretionary powers to any extent. The most economical way to employ them is to place an inspector with discretionary powers over a gang; all doubtful cases are submitted to him, and he carefully scrutinises the rejections to ascertain that they are necessary.

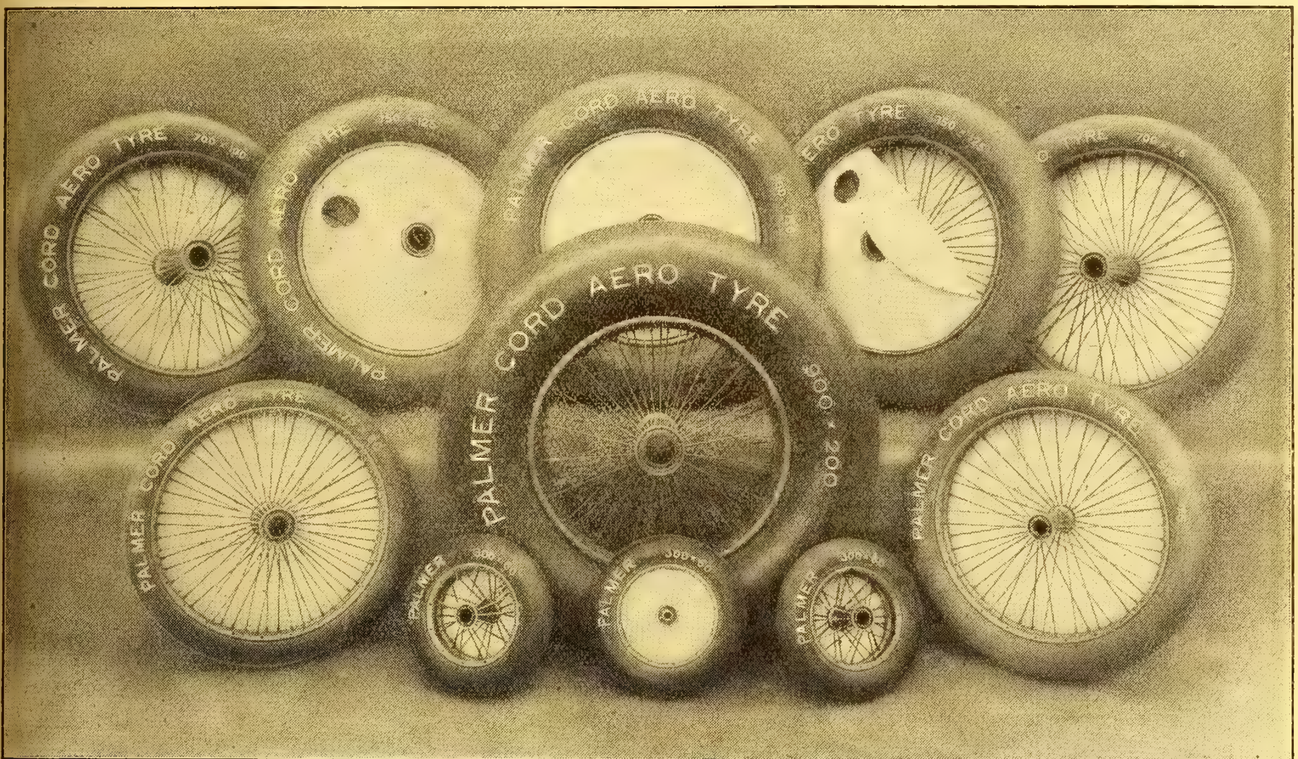
Where the amount of work is large and numbers of girls are employed, the rejections should be gone over by a specially appointed inspector, as many of the parts rejected by women viewers can be made use of for production purposes, either by alteration or by selective assembly. Of women employed on routine work inspection some show greater aptitude and intelligence than others, and these certainly make excellent inspectors. With one or two exceptions, however, they do not, in the president's experience, approach the man who has done his five years in the shops, and been through a technical college training. It can hardly be expected that this should be otherwise; yet it would not be surprising if at no distant date women were found competing in engineering.

Rejections.

It is very necessary to arrange a proper system for dealing with rejections. When Government inspection is in force the following procedure should be adopted:—The junior Government inspector rejects. This is confirmed by a senior member of the staff, who then labels the part to show the cause of rejection, and who should also express an opinion as to whether the part can be returned to the shop for rectification. The part should then be passed back to the firm's viewers, who, if they are in agreement with the Government inspector, will take action accordingly; if they are not in agreement the part should be put on a "pending table," and a higher authority called in for consultation. In a large inspecting organisation this is arranged for by the appointment of district and travelling officers. The main object of instituting such a procedure is that the reason for rejections may be known at the earliest possible moment to the producer, so that the cause may be removed.

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575×60	111	150.	38.09	104/46
"	21	160.	28.	Central
"	34	150.	31.75	104/46
650×65	78	178.	44.45	132/46
"	100	178.	38.09	132/46
"	101	178.	31.75	132/46
600×75	111	150.	38.09	104/46
"	21	160.	28.	Central
"	34	150.	31.75	104/46
700×75	78	178.	44.45	132/46
"	100	178.	38.09	132/46
"	101	178.	31.75	132/46

Tyre Sizes	Wheel No.	Hub Length m/m	Hub Bore m/m	Track Line m/m
700×75	*80	178.	44.45	132/46
"	*91	178.	31.75	132/46
"	*98	178.	44.45	Central
700×100	92	185.	55.	135/50
"	95	185.	55.	Central
"	77	178.	44.45	132/46
"	93	150.	40.	Central
"	33	150.	38.09	Central
"	99	178.	38.89	132/46
"	96	178.	55.	132/46
750×125	92	185.	55.	135/50
"	95	185.	55.	Central
"	77	178.	44.45	132/46
"	93	150.	40.	entral
"	33	150.	38.09	Central
"	99	178.	38.89	132/46

Tyre Sizes	Wheel No.	Hub Length m/m	Hub Bore m/m	Track Line m/m
750×125	96	178.	55.	132/46
800×150	82	185.	55.	135/50
"	85	185.	55.	Central
"	†36	185.	55.	135/50
"	†40	185.	60.32	135/50
1000×150	97	250.	65.4	Central
"	102	185.	55.	125 60
"	201	185.	60.32	125/60
900×200	39	185.	55.	Central
"	42	185.	60.32	125/60
"	47	185.	55.	125/60
"	202	185.	60.32	Central
1100×200	52	185.	55.	116/69
"	57	185.	55.	Central
"	203	185.	60.32	116/69
"	204	185.	60.32	Central

*Wheels Nos. 80, 91 and 98 are fitted with a wider and stronger rim, and the 700 x 75 tyres when fitted to this rim caliper 83 m/m.

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PARIS: 24, Boulevard de Villiers, Levallois-Perret.

THE PATENTS INDEX.

The subjoined list of recent inventions has been specially compiled by The Aeroplane from the current Official Patents Records.

Patent Applications.

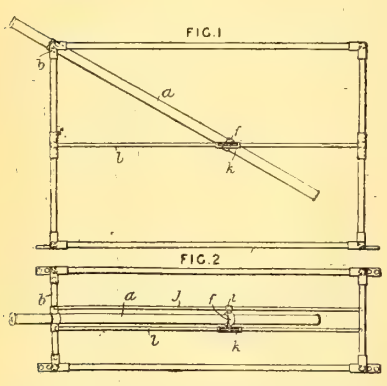
Abrahams, E. G. Aircraft. No. 15200. Oct. 19th.
Allom, Sir C. C. Aerial machines. No. 15227. Oct 19th.
Andrew, P. Mechanical silencing arrangement for exhaust gases of internal-combustion engines. No. 14879. Oct. 15th.
Calthrop, E. R. Means for destroying aircraft. No. 15221. Oct. 19th.
Gunn, M. J. Means for utilising wind pressure. No. 15215. Oct. 19th.
Hamer, T. E. Press for gluing up airscrews, etc. No. 15034. Oct. 17th
Hamilton, D. G. Cramping means to be employed in manufacture of aircraft propellers. No. 15249. Oct. 20th.
Hawksley, A. F. Bearings for axles of wheels of aeroplanes. No. 15138. Oct. 16th.
Leven, C. Aircraft. No. 15208. Oct. 19th.
McIndoe, R. W. Fuel tanks of aircraft, etc. No. 14943. Oct. 16th.
Morley, F. W. Hydroplanes, etc. No. 14990. Oct. 15th.
Nightingale, W. A. G. Dirigible airships. No. 14914. Oct. 15th.
Rye, A. L. Height-finders, range-finders, etc. No. 15000. Oct. 16th.
Sanders, H. Petrol and oil tanks for aircraft, etc. No. 14935. Oct. 16th.
Schurr, A. E. Landing-gear of aeroplanes. No. 14945. Oct. 16th.
Sopwith Aviation Co. Radiators for water-cooling systems of internal-combustion engines on aircraft. No. 15045. Oct. 17th.
White, J. Silencing internal-combustion engines. No. 15046. Oct. 17th.
Wigram, A. D. Aerial torpedo. No. 14972. Oct. 16th.

Complete Specifications Accepted, Prints of which can be obtained on and after November 8th, 1917.

110,120. Oct. 16th, 1916. Roberts, H. Propeller or driving wheel to put in motion vehicles, boats, and flying-machines.

Abridgments of recently published Specifications.

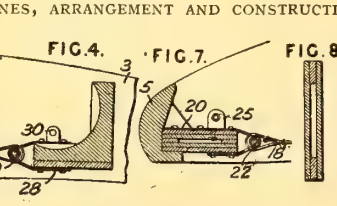
108,893. Sights for use on aircraft. Mills, E. W., Alex Villa, Littleover, Derby. Aug. 24th, 1916, No. 12029. [Class 92 (ii).]

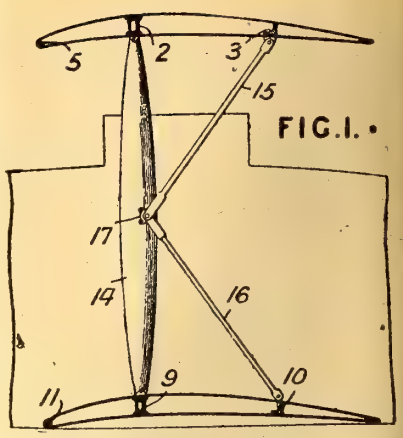


Relates to bomb-dropping sights of the kind in which a telescope or other instrument is angularly adjustable in relation to a fixed angle scale and is set in accordance with tables for height and speed, and consists in the combination of a pivoted telescope *a* or other instrument, and a ring *f* slidable on the telescope and pivoted to a cursor *k* sliding on a fixed slide bar *l*, and to a ring *i* sliding on a guide-bar *j*, Fig. 2, parallel to the scale bar. The scale and guide-bars may be curved concentric with the pivot *b* of the telescope. An electric lamp may be fitted on the cursor for night use.

109,081. Aeronautics. Martin, J. V., 13, Elizabeth Street East, Detroit, Michigan, U.S.A. Aug. 28th, 1916, No. 12154. [Class 4.]

Planes, arrangement and construction of.—Aeroplanes having superposed planes are provided with a single row of struts 14 between adjacent planes to which they are braced by members 15, 16 extending from the centres of the struts, bracing being also provided within the planes to take drift stresses. The planes have laminated box spars 2, 9 arranged at the normal centre of pressure, leading-edge bars 5, 11 show enlarged in Fig. 7, and rear spars 3, 10 shown enlarged in Fig. 4. Cross-bracing wires 18 are secured to bolts 22, 29 carried by eyes formed in metal plates 20, 28 secured to the leading-edge bars and rear spurs. Lugs 25, 30 enable the plates 20, 28 to be secured also to the ribs, which are of the section shown in Fig. 8. The struts 14 are of streamline section built up of laminations parallel to the ribs, and have fittings 17 to take the forked ends of the braces 15, 16.





APPRENTICESHIPS.

The following letters have been received:—

Sir,—The publication in your paper of the scheme for training apprentices as adopted by Peter Hooker, Ltd., should be greatly appreciated by the hundreds of firms now employed in aircraft construction. The writer ventures to draw attention to one or two points not so much in a critical spirit as with a view to provoking discussion.

(1) It is useful to recollect the supreme and growing importance of the tool-room in modern workshop organisation—remembering that the tool-room should be self-contained as regards all its machine-tools. Usually the best tool-room hands are born mechanics—those who love their work for its own sake. A special grade of tool-room apprentices, who would pass through the small-tool stores, view-room, tool-room, and jig and tool-room D.O., might be considered.

The best apprentices from this course should develop into that most useful and highly paid class of employee—production men.

(2) The writer views with some mistrust the spending of three months only in the electrical department. It is too short a time to acquire any real practical electric knowledge. Apprentices might be given the option of spending, say, six months in this department and cutting out the three months in the tool-room. Modern electrical engineering is no subject with which to trifle.

It is possible to carry too far the process of spending a short time in each of the great departments into which a large modern works is necessarily divided. There are too many of them.

(3) The spending of three months each in the jig and tool D.O. and in the engine design D.O. is open to a similar criticism. When an apprentice is nearly out of his time, his employers have a shrewd notion as to where his abilities lie Three months in the J. and T. D.O. is much too short for any useful purpose; and the option of giving an apprentice his choice might be considered.

The design of engines is a totally different class of work to the design of the jigs and tools which help to make them. It is very seldom that the two gifts are combined in one man. The latter is usually born, but the former a result of much technical education.

(4) The scheme as published in your paper makes no specific mention of the test bay. This may be, however, included in "assembling." The best apprentices pick up their most valuable knowledge and experience here. It should certainly not be forgotten.

In conclusion, the writer would like to make an appeal to Trade Union leaders not to forget the debt of gratitude they owe to sound apprenticeship schemes—honestly got out and worked for the benefit of the youth of to-day. In the vital end, the inborn strength of any Trade Union depends much more on the skill of its members than on the mere counting of a mixture of heads.

If the leading unions would co-operate, say, by offering prizes of technical books, a better all round feeling might result in the complete working of this or similar schemes.

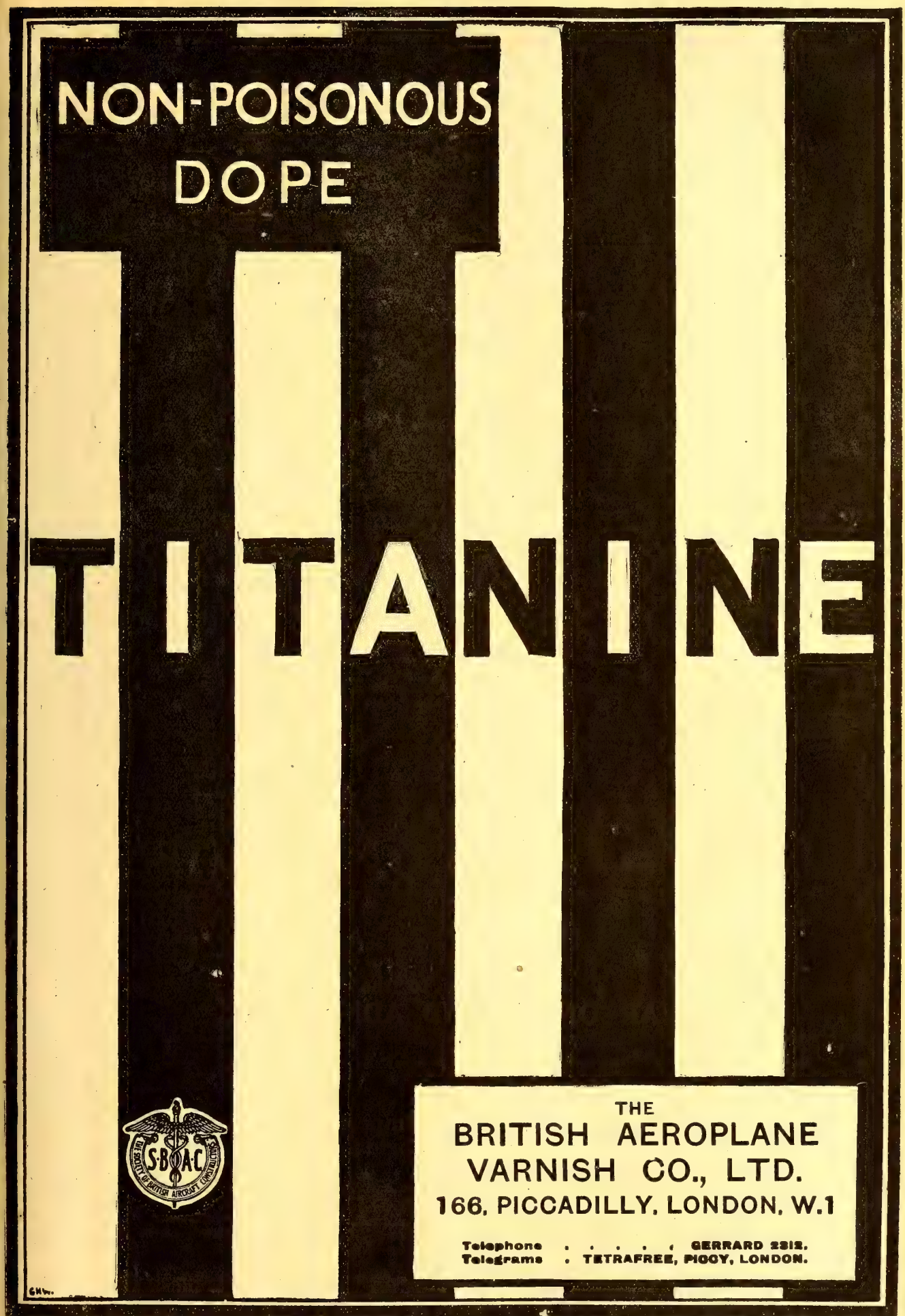
(Signed) O. Paul Monckton.

* * *

Sir,—I was very much interested in the article, "The Training of Apprentices," in the last issue of The Aeroplane. I think it has come at the right moment. I might state that my wife took her young brother, just left school, to ——, Ltd., at ——, to have him apprenticed to the aeroplane trade, but was astonished to be told that they were not taking apprentices, as they had women to do their work.

If this is to be the case with other firms, what will the aeroplane trade be like in two or three years' time? I think you will do your best in your paper to get this bad trade business altered.

(Signed) A. B.



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THE AIRCRAFT TRADER

MARKET TOPICS.

Prices given are for quantities on usual terms.

Oct. 25th, 1917.

COPPER.—There has been no material change in the condition of this market. The threatened shortage is still looming in the distance. There is no news of any approaching settlement of the labour troubles, and in the meantime the consumption is rapidly increasing. During August, the U.S. consumption was 3,000 tons in excess of the Copper retained for domestic use.

A recent cable states that the U.S. authorities will in all probability commandeer the enormous stocks of Steel, Copper, Zinc, Aluminium, and other raw materials held by Dutch, Swedish, Norwegian, and other neutral firms' agents, and also the huge stocks held for Germany and Austria.

This step is certainly justified, as it is more than likely that a large proportion of the neutral stocks were bought for the enemy.

The American authorities do not appear yet to be exercising strict control of the metal, and speculators are still very busy in spite of the official price having been fixed.

Supplies here are well maintained and prices remain unaltered.

Comparative Prices.

To-day	£110	0	0 per ton.
Last Year	123	10	0 per ton.
1915	73	0	0 per ton.
Highest Price, 1915	153	0	0 per ton.
Lowest Price, 1915	84	0	0 per ton.

TIN.—Large supplies of Tin have recently been received, but the demand has been well maintained, in fact, a large quantity of material is due against old contracts. Buyers have been very active and prices have soared to an extremely high level, having reached £249 per ton. The question of supplies is certainly the main factor to be reckoned with, and everything seems to indicate that they will be very irregular.

Comparative Prices.

To-day, 25th	£247	10	0 per ton.
October 19th	249	0	0 per ton.
October 17th	247	10	0 per ton.
Last Year	180	0	0 per ton.
Highest Price, 1916	205	0	0 per ton.
Lowest Price, 1916	161	10	0 per ton.

LEAD.—Supplies are now much better. It is, of course, impossible to procure any deliveries for anything but work of national importance.

Official prices remain unaltered.

STEEL.—Supplies of Aircraft Steels are coming through more regularly, due partly to the increase in the number of firms who are now producing; it is, however, very obvious that some firms are still producing steel for ordinary peace-time purposes, and it is certainly time that every ounce of Steel produced should be for war requirements. It is a foolish policy to wait until constructors, who are making tremendous exertions to considerably increase their outputs, are actually ready to place their orders; the time to get as many mills as possible on Aircraft Steels is *now*. Central stocks can be built up, and the material will be there when wanted.

Prices remain unaltered, although it would not be at all surprising if an increase was not found necessary, indirectly due to the increased cost of fuel.

TIMBER.—Who is responsible for the Aircraft Timber shortage? is a question which remains to be answered. Early in August Sir H. Dalziel asked the Minister of Munitions who was responsible for passing the Government stocks of Silver Spruce, which large manufacturers of aeroplanes refused to use, and of which only 20 per cent. was found suitable. In reply, Sir W. Evans promised to inquire.

The answer does not appear to have been given yet, and it would be interesting to know the result of the inquiries made. If the Admiralty knew in May or June that they could not give the shipping necessary to bring sufficient Timber here to keep the country's aircraft factories supplied, why has it taken the authorities about five months to consider the question of substitutes?

Even now it is doubtful whether they have made up their minds whether one particular substitute will be used. The shortage is certainly very acute, and apparently the worst has yet to come. Has it occurred to the authorities that the inspection of wood and wood parts for school machines might be relaxed? It is not inferred that "dud" wood or parts should be used, but it is a well-known fact, not rumour, that A.I.D. inspectors still adhere to their inflexible, cast-iron, microscopical inspection of wood and components, with the result that a huge quantity of Timber parts are continually being consigned to the scrap heap.

The officials responsible for Dope have, after nearly being too late, sanctioned a substitute Dope for school machines, and the Timber officials are recommended to consider the advisability of having two standards of inspection for school and service machines, or of immediately giving sanction for another wood to be used on the former, or, alternatively, they should investigate very strictly the appalling quantity of rejected wood components.

Mahogany continues to be very scarce.

Prices are still very high, English Ash especially reaching a very high figure, the labour and cartage difficulties being responsible for this.

FABRIC.—There appears to be more trouble in store for the constructor, no indications being visible of the impending shortage of Fabric being averted. It is reported that the employers have rejected the decision of the Government arbitrator, and the outlook is, therefore, still very black indeed.

CURRENT MARKET PRICES.

Oct. 26th, 1917.

The prices given below are the prices ruling on the above date.

TERMS.—Usual for the various materials mentioned.

Prices of old metals are as quoted by scrap dealers.

Prices must not be taken as specific quotations for definite quantities delivered to any part of the country.

ALUMINIUM.	
Ingot	£225 per ton.*
Remelted	£210 per ton.*
BRASS.	
Sheets	15⅛d. per lb.
Strip	14⅛d. per lb.
Wire	14⅛d. per lb.
Tubes	15⅝d. per lb.
Castings	15d. per lb.
Turning Rod	14d. per lb.
Brazed Tubes	19½d. per lb.
COPPER.	
Ingot, Standard, Cash	£110 per ton.*
Ingot, Standard, 3 mos.	£110 per ton.*
Best Selected (Nett)	£123 to £119 per ton.*
Sheets	£150 per ton.
Wire	15¼d. per lb.
Tubes, S.D.	18½d. per lb
Tubes, Brazed	18½d. per lb.
Rivets	1s. 10½d. per lb., basis.
Tacks	1s. 10d. per lb.
FABRIC.*	
Linen, R.A.F., 17C, Spec., 36 in. wide, 2s. 8d. p. yd.*	
Linen, R.A.F., 17C, Spec., 38 in. wide, 2s. 9½d. p. yd.*	
Spaced, R.A.F., 17C, Spec., 37½ in. wide, 1s. 9d. p. yd.*	
GUN METAL.	
Castings	1s. 8d. per lb.
LEAD.	
Virgin Pig	£29 per ton, c.i.f.*
Virgin Pig	£30 per ton, ex stores.
Sheets	£39 10s. per ton, D/D.
Pipes	£40 per ton.
Dry White	£46 10s. per ton. less 5 per cent.
White in Oil	£53 per ton. (lots over 5 cwt. less 5 per. cent.)
White in Oil	£55 per ton. (lots under 5 cwt. less 5 per cent.)
Red, in Oil	£42 per ton, less 2½ per cent.
NICKEL.	
Nickel	£200 per ton.*
PHOSPHOR BRONZE.	
Ingots, 5 cwt., and under	£150 to £170 per ton. (Subject to Copper and Tin Fluctuations.)
Castings	1s. 7d. to 1s. 9d. per lb.
PHOSPHOR COPPER.	
Ton lots	£200 to £205 per ton.

SILVER.

Silver .....42⅞ per oz.

SOLDER.

Plumber's .....104s.
Tinman's .....137s.

STEEL.

High Speed, 14 p. cent., Tungsten, 2s. 10d. per lb., basis.*†
High Speed, 18 per cent., Tungsten, 3s. 10d. per lb., basis.

ALLOY STEELS TO AIR BOARD SPECIFICATIONS.

Round and Square :—

Specification No. S2	£86
Specification No. S2 (bright-drawn)	£115
Specification No. S8	£86
Specification No. S10	£70
Specification No. S12	£75
Specification No. S14	£43
Specification No. S15	£70
Specification No. S16	£70
Specification No. S17	£75
Specification No. S18 (oil-hardened)	£86
Specification No. K1	£75
Specification No. K2	£75
Specification No. K3	£86

The above prices are for ¼ in. to 5/16 in. only, other sizes are proportionate.

HEXAGONS.*

	.455 and .525	.601 and .710
Specification S2	£79	£77
Specification S8	£79	£77
Specification S2 (bright-drawn),	£112	£112
Specification S8 (bright-drawn),	£112	£112

SPELTER.*

English f.o.b., Birmingham £57

TIN.

Tin £249

TINPLATES.

Tinplate .....30s., basis, f.o.t.*

TIMBER.

	Official.	Merchants.†
Silver Spruce,	10s. 4d.	17s. 9d., c.f.
English Ash		16s., c.f.
Mahogany,	1s. 6d. to 1s. 10d.	2s. 2d. to 2s. 6d., s.f.
Walnut,	2s. to 2s. 3d.	2s. 3d. to 2s. 6d., s.f.

ZINC.

Zinc Sheets (American).....£100, f.o.b., New York.

SCRAP MATERIALS (LONDON PRICES).

ALUMINIUM.

Description.	Price per ton on sale to refiner, delivered at refinery.
Sheet cuttings and rods containing a minimum of 96 per cent. Al.	£160 0 0
Old rolled, etc., containing a minimum of 96 per cent. Al.	120 0 0
Spinnings, punchings, and thin small scrap; also painted and varnished scrap that needs melting, containing a minimum of 96 per cent. Al.	105 0 0
Lump scrap from aero castings and material of equivalent value, containing 87 to 95 per cent. Al.	100 0 0
Turnings and Swarf generally, containing 87 to 95 per cent. Al.	87 10 0
Scrap, generally containing 80 to 86 per cent. Al.	80 0 0
Swarf and inferior Swarf, generally containing below 80—86 per cent. Al.	70 0 0
All Scrap, containing below 80 per cent. Al., not to exceed	65 0 0
All Swarf, containing below 80 per cent. Al., not to exceed	60 0 0
Brass, Heavy Selected	£88
Copper, Clean	100
Copper, Brazery	78
Gun Metal, Scrap	118
Lead, no Draft	26
Zinc, Old	40

*Official Prices.
†Includes Selection and Deliverv.
‡Prices include Delivery in the U.K.

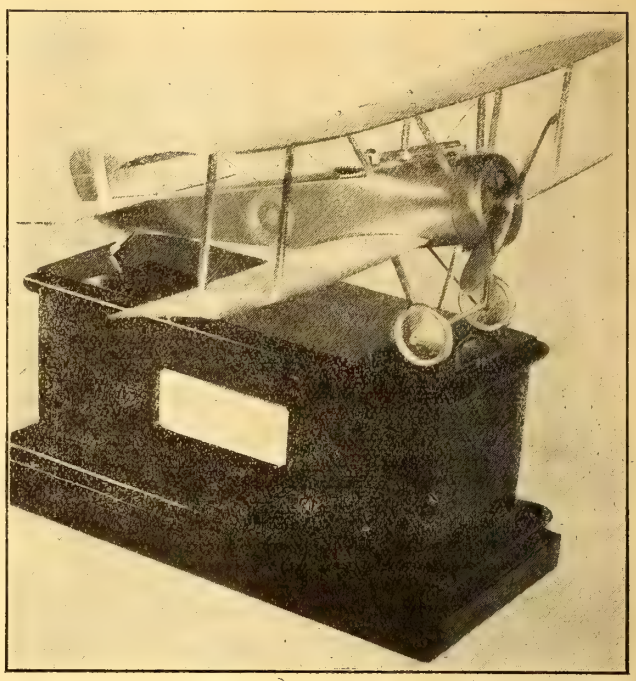
THE GRAHAME-WHITE AVIATION COMPANY, LIMITED.

Several changes are announced in the personnel of the Grahame-White Company, Ltd.

Mr. T. Kemp-Walton has resigned the post of Secretary to the Company.

Mr. T. E. Ritchie, works manager, has also resigned.

Mr. F. T. Nettleingham, late observer, R.F.C., has rejoined the Company at its Hendon Works.



A model of a Sopwith Single-seater made by the Goldsmith's and Silversmith's Company.

IN THE R.N.A.S.

It is interesting to learn that a 1s. edition of the letters of the late Flight Lieut. Frank Rosher continues to sell, and as a result of the profits therefrom being entirely devoted to the various funds for the Flying Services, quite handsome sums have been handed to the R.N.A.S. Comforts Fund and the Royal Aero Club Flying Services Fund. The book is particularly apposite at the present time when the Air Services are very much in the minds of the people, because Lieut. Rosher had himself done a considerable amount of bomb dropping, and the sensations of a raiding aviator are excellently described by him in the book. Copies may be obtained from the Wm. Dawson Publishing Co., Ltd., Rolls House, Breams Buildings, E.C.4, price 1s. 3d., post free.

SWIFT PROGRESS.

The Swift Aviation Co., of Richmond Road, Kingston, reports successful progress in the matter of aircraft components production, and the large amount of work in hand has made it necessary to take new premises. A new woodmill has been acquired at 74, London Road, Kingston, and a fitting shop at Cowlease Road, Kingston, which will enable the output to be increased very considerably. Inquiries are invited by the proprietor, Mr. Wilson.

The firm is prepared to undertake wood and metal parts of every description, and prompt quotations will be given upon receipt of blue prints and specimens.

CONGRATULATIONS.

BURGESS-HILL.—On Saturday last a wedding took place at the Harlesden Congregational Church between Mr. George F. Burgess and Miss Kate M. Hill, both of Harlesden. The bride was attended by three bridesmaids, Misses Bertha and Ada Hill (sisters) and Miss Dorothy Jarman (cousin). The duties of best man were carried out by Mr. F. Brewer. The ceremony was performed by Rev. James Cregan, of Paddington Chapel, and Mr. Albert Harrison officiated at the organ.

Mr. George Burgess has been working for the past five years at the Grahame White Aviation Co., Ltd., as chief storekeeper. On the day previous to the wedding he took up similar work with the Wycombe Aircraft Constructors, Ltd. He was presented by the staff of the stores department with a splendid set of cutlery and many good wishes, both for his happiness in his married life and in the new work he is taking up.

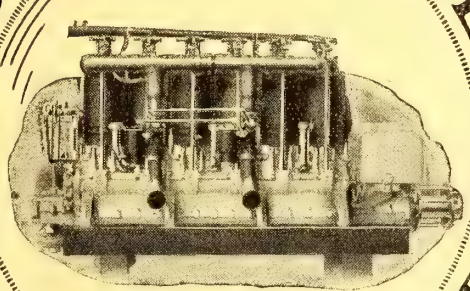
AEROPLANE METAL WORK.

The works of Palladium Autocars, Ltd., Felsham Road, Putney, S.W.15, are turning out a considerable amount of aeroplane metal parts. Plant is available for all kinds of metal work, a speciality being made of pressings and stampings and the attendant welding.



ARMSTRONG, WHITWORTH
AIRCRAFT WORKS,
NEWCASTLE-UPON-TYNE.

TELEPHONE:- 500 GOSFORTH.
TELEGRAMS:- ARMSTRONG AVIATION,
NEWCASTLE-ON-TYNE.

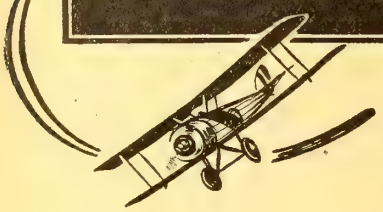
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AIRCRAFT FINANCE

CURRENT TOPICS.

What is a Balance-sheet.

Under the above title in my article published October 17th last, I pointed out what I considered to be the very loose manner in which balance-sheets are drawn up. Referring to my criticisms I have received a letter signed, "Chartered Accountant, R.F.C." Regarding details generally, he appears to agree with my views, the latter part of his letter, however, is so interesting, representing, as it does, so clearly the accepted professional point of view, that I make no apology for reproducing exactly what he says:—

". . . . I would also point out that although in the printed balance-sheets of companies, it is frequently the custom to group freehold and leasehold properties, fixtures, machinery, etc., together, separate accounts of these assets are kept in the company's private ledger. This being so, it is perfectly simple for the auditor to see that the proper provision for depreciation on the various assets has been made. These groupings, of which complaint is made, are usually done so that useful information may not be given to rival concerns."

He admits that important details are grouped together with the distinct object of disclosing as little as possible, and when one recognises the fact that invariably this is the only document provided for shareholders, to enable them to judge the position of the company, it must be admitted that it lends itself to every conceivable form of deception. Unfortunately, the reason "Chartered Accountant" gives for this non-disclosure is not always the true one, and if this method is allowed to become the rule without any protest, it may result in such a grouping together of figures, that would in time render the balance-sheet, from the point of view of giving shareholders information, absolutely useless and misleading.

It is to be hoped that the Institute of Chartered Accountants may be induced to examine this important question for the guidance of its members, and the protection of the investing public.

Air Raid Insurance.

A general paragraph on this subject will serve to reply to several inquiries received connected with insurance against loss of life, damage to property, as well as employers' liability in respect of injuries received from enemy aerial attack. There are several British Insurance Companies providing special policies to cover these risks, but I am making careful inquiry, and a study of the different propositions, the benefits of which I will explain so soon as I have completed my research.

In the meantime, a judgment of considerable importance affecting the liability of employers for injury to their employees through air raids was given at Bow County Court, by Judge Graham last week. Owing to its being in the nature of a test action His Honour regarded it as desirable to reserve it for a considered decision. The facts were simple, and not disputed. The applicant, a potman in the employ of a publican, was on a ladder outside the premises cleaning a plate during a recent visitation of enemy aircraft, when one of the bombs dropped struck the roadway near him, throwing him off the ladder, resulting in his sustaining injury to one of his ankles. He claimed an award against his employer under the Workmen's Compensation Act.

Judge Graham's finding is in favour of the applicant. His Honour held that it remained for the respondent to substantiate his case by proving that the applicant was running nothing more than a common risk. This, he thought, he had failed to prove.

The instance of a man struck by lightning was often cited as a common risk in respect of which compensation could not be recovered. But between that and the present case there appeared to be some material distinction. In this, and in other cases mentioned, a large number of people were running the same risks which led to the accident, but they were exposed to those risks because they happened to be in a particular place by their employer's order, and not because they happened to be human beings who were all liable to the same risk at all times and in all places, and whether employed or not, as in the lightning instance.

It appeared to him that the risk the applicant ran could only have been said to have been a common risk in the sense that all the people who happened to be in the street at the time, or all the people in the London area, were running the same risk at the same time.

The judgment is to be appealed against, as was to be expected, since so important an issue could hardly be left to be ultimately decided by a junior Court. The finding, however, is chiefly significant thus far because it is directly opposed to the view taken by the insurance offices and a great many other people who may be called authorities.

The insurance offices adopted a common attitude of no liability after taking legal advice, and, as is well known, some of them have issued special policies to cover what they treated as a risk outside their ordinary contracts, and many employers have taken out these policies for the protection of their employees, and no doubt employees have also taken out policies on their own behalf to cover risks which they understood to be beyond the legal liability of the employer. The whole situation thus created will have to be reviewed if Judge Graham's verdict is sustained.

So far as the insurance offices are concerned, an assumption of the liability is not likely to be a serious one, for, having regard to the fact that most of the raids are at night, when the greater number of people are not working, and that the casualties sustained in any one raid are relatively insignificant compared to the insurable industrial population, the total losses in a year should be well within the resources of the companies, even if additional premiums were not exacted. Moreover, there is the question as to how far the offices would be advantaged by the Prime Minister's statement in July last that the Government accepted the principle of compensation to those who suffered damage by enemy attacks. But does that only apply to those not covered by existing insurance policies?

A Question of Policy.

The Aeroplane was the recipient this week of an invitation to print a full page advertisement from a concern claiming to be "The Original Aircraft Insurance Bankers." The wording of the proposed advertisement alone was sufficient to disclose the thinly veiled bait, but it is so interesting that I feel it merits being set out in full:—

"Three Reasons why Aircraft Shares should be purchased."

(1) Because it is as Patriotic as investing in the War Loan.

(2) Because an investor is building up a Reserve Fund for after the War. The capital appreciation on this class of investment will go to counter-balance the depreciation on other investments caused by the War.

(3) Because by investing in Aircraft securities a yearly increasing income is assured.

BUT the "right" share must be purchased, and hazardous or "wild-cat" schemes must be avoided.

Departments:—Investments (I).
Finance (F).
Contract (C).
Supplies (S).
Machinery and Tools (M T).
Technical Advice (T).
Accountancy (A).
Insurances (P).

Protection.

Everyone wishing to make money, yet at the same time to help the country, should avail themselves of our Financiai and Technical Service whether he be aircraft manufacturer or the smallest investor.

No enquiry considered too small to receive careful attention.

No efforts will be spared by The Aeroplane to prevent the use of Aviation as a means of securing "easy" public money, and to suppress and circumvent by every means any such palpable attempts to inveigle the public. Readers would be rendering a service to the public if they will forward to the Finance Editor of this journal all copies of circulars sent to them unsolicited, for criticism.

The Aircraft Manufacturing Company, Ltd.

Issue of 250,000 7 per Cent. Cumulative and Participating "B" Preference Shares of £1 Each.

The lists of Subscribers to this issue will close on or before Nov. 3rd. These shares are entitled, after payment of 7 per cent. on the First Preference shares, to a fixed Cumulative Preferential dividend at the rate of 7 per cent. per annum and to a participation of 20 per cent. of the amount by which the remaining profits

which it would be determined to distribute in any year shall exceed £5,000 (the amount of the fixed dividend on the Preferred Ordinary shares), providing that such participation shall not in any one year exceed an additional 7 per cent., and the Company are pledged not to create debentures or shares ranking in priority to or *pari passu* with, the "B" Preference shares in the issue without the sanction of the "B" preference shareholders.

The profits since the inception of the Company to March 31st last are certified as follows:—

Nine Months ended March 31st, 1913	...	£9,762 11	4
Year ended March 31st, 1914	...	22,256 0	3
" " " 1915	...	27,252 3	5
" " " 1916	...	60,905 2	11
" " " 1917	...	107,361 12	1

from which it will be seen that upon the basis of the profits for the year ended March 31st, 1916, the fixed dividend on the "B" Preference shares is covered more than five and a-half times, and the prospectus states that, including the proceeds of the present issue, these shares will be covered by assets representing 30s. for each £1 subscribed.

This Company is a sound, well-managed concern, and is now the greatest undertaking of its kind in the world. The company is under the able management of Mr. G. Holt Thomas, whose pre-eminence in the Aircraft Industry is acknowledged, and is in every way to be recommended. It is confidently expected that the issue will be over-subscribed.

NEW COMPANY REGISTERED.

ASSOCIATED AIRCRAFT, LTD.—Registered Oct. 20th, 1917. Nominal capital £25,000, divided into 10,000 Preference shares and 15,000 Ordinary shares, all of £1 each. To carry on business of manufacturers of aircraft and component parts thereof, manufacturers of electrical appliances and material, motor, electrical and general engineers, etc. Registered offices, 97, New Bond Street, London.

COMPANY IN LIQUIDATION

GENERAL AVIATION CONTRACTORS, LTD.—The statutory first meeting of the creditors and contributories of this Company was held at the Board of Trade Offices on the 24th inst. under a winding-up order recently made. The Senior Official Receiver presided at the meeting, and stated that a printed official report would shortly be issued The meeting resolved to leave the liquidation in the hands of the Official Receiver.

MORTGAGE REGISTERED.

HEWLETT & BLONDEAU, LTD., LEAGRAVE.—Registered Oct. 11th, mortgage securing all moneys due or to become due to London City and Midland Bank, Ltd.; charged on all moneys due or to become due from Minister of Munitions under a certain contract, £5,000. Jan. 15th, 1917.

ANSWERS TO CORRESPONDENTS.

A Financial Specialist will be pleased to answer in these columns inquiries on any subject affecting or relating to Investments, Stocks, Shares and Securities of Aircraft and kindred companies, free of charge.

"Inquirer."—You will find particulars of New Companies registered from time to time in this section, which means that the file may be inspected at Somerset House on payment of the search fee of 1s. for full detailed registered information.

"Capital."—The terms "cum dividend" and "ex dividend" affixed to Stock Exchange quotations designate to whom the pending dividend is payable. Where the quotation is marked "ex dividend," it means that the seller would retain the dividend. In the case of "cum dividend," it means that the shares are bought with the advantage of the accrued dividend. The Companies (Consolidation) Act, 1908, Section 31, gives a company power, on giving notice by advertisement, to close the register of shareholders for a time or times during one year not exceeding in the whole thirty days. The object of this clause of the Act is to permit the closing of the registers for the purpose of preparing the dividend warrants. The usual rule is for companies to close their transfer books for ten days. It is during this period that transfers are not accepted by the company for the reason set out. Consequently, it is necessary to clearly designate between the buyer and the purchaser to whom the pending dividend shall belong, hence the necessity of marking quotations "ex" or "cum" dividend.

"Novice."—The British and Colonial Aviation Co., Ltd., is a private company, registered February, 1910, with a capital of £100 in £1 shares, and all the shares are held privately. It is what is known as a "close corporation"—that is, the directors have power to refuse to transfer to any non-member, providing an existing member is willing to acquire the would-be vendors holding, subject to the usual safeguards provided in the articles of association.

AIRCRAFT WORKERS' WAGES.

A meeting of employers engaged in aircraft construction was held on Oct. 26th at Caxton Hall to consider the adoption of a standard minimum wage for skilled woodworkers in the London area. The following resolution was carried unanimously:—

"That the employers are prepared to agree to a standard minimum rate (inclusive of war wages) in relation to the rise in the cost of living, such rate and rise to be determined by the Government, on the understanding that the Unions agree to a system of payment by result in conjunction therewith."

The resolution was submitted to the consideration of the representatives of the Trade Unions concerned, but the employers were informed that these representatives felt themselves unable to discuss the question of a standard rate in conjunction with the system of additional payment by results.

The Ministry of Munitions makes the following announcement:—

Following on the report of a committee which was appointed by the Minister of Munitions, consisting of representatives of the Ministry of Munitions, the employers, and the National Aircraft Committee, and subsequent negotiations with reference to the terms and conditions of employment for skilled wood-workers, including wood-cutting machinists, employed on aircraft, a settlement has now been arrived at in regard to the establishment of standard district rates and working conditions for all districts. The details of the settlement will be announced forthwith.

A SPECIAL ISSUE.

The attention of the readers of THE AEROPLANE is directed to a special issue of the "Sphere," devoted to aviation and kindred subjects which was published on Oct. 27th.

It contains many photographs and black and white drawings, illustrating the many phases of aerial warfare, and some very fine reproductions in colour, notably three double-page colour plates by Messrs. Charles Wyllie, G. H. Davis, and F. Matania.

The frontispiece is a particularly fine black and white sketch by Mr. G. H. Davis, showing a Handley Page biplane at work bombing an enemy coast town. This picture gives a really first-class idea of the massive construction of this fine machine.

The proprietors of the "Sphere" are to be congratulated upon the success with which their special number has been produced.

A NOTTINGHAM PRESENTATION.

On Oct. 27th the Duke of Portland, on behalf of the Nottingham Chamber of Commerce, presented an aeroplane to the Imperial Air Fleet Committee, represented by Lord Desborough, who in turn presented it to Sir James Mills, representing the New Zealand Government. Major-General J. M. Salmond, C.M.G., D.S.O., D.G.M.A., took over the aeroplane for the R.F.C.

The gift was intended as an acknowledgment on the part of the people of Nottingham of the splendid work done in the present war by the New Zealand Forces. Just where New Zealand directly profits by the gift is not very clear, as there is no separate New Zealand section of the R.F.C.

CURRENT SHARE QUOTATIONS.

The following are the share quotations made up to Tuesday morning in each week of the principal companies engaged in the Aircraft Industry and Kindred Trades.

Aircraft Mnfg. Co. 7% cum. pref. £1 ...	23 -	24/-
Armstrong (Sir W. & Co., Ltd.) 4% cum. pref. £5...	3¾	3⅞
Armstrong (Sir W. & Co., Ltd.) 5% 2nd. pref. £1 ...	17/-	18/-
Armstrong (Sir W. & Co., Ltd.) £1 ordinary	39/-	40/-
Austin Motor Co., Ltd. 7% cum. pref. £1...	18/-	19/-
Austin Motor Co., Ltd. £1 ordinary	26/6	27/6
Birmingham Small Arms Co., Ltd. £1 ordinary	52/6	53/6 x
Birmingham Small Arms Co., Ltd. 5% cum. "A" pref.	4-5/16	4-7/16
Birmingham Small Arms Co., Ltd. 6% cum. "B" pref.	19/-	20/- x
Boulton & Paul, Ltd., 5% cum. pref. £1	¾	⅞
Brown Bros., Ltd., 6% cum. pref. £5...	4⅛	4⅝
Darracq (A) & Co., (1905) Ltd. £1 ordinary ...	38/-	39 -
Darracq (A) & Co., (1905) Ltd. 7% cum. pref. £1 ..	23/-	24/-
Electric Construction Co., Ltd. 7% cum. pref. £1...	19/3	19/6
Electric Construction Co., Ltd. £1 ordinary	1	1-1/16
Fellows Magneto Co., 8% cum. partip. pref.	17/-	18/-
General Electric Co., Ltd. 6% cum. pref. £10	10-5/16	10-7/16
General Electric Co., Ltd. £10 ordinary	17	18
Gwynnes, Ltd., 5% cum. pref.	91/-	92/-
Gwynnes, Ltd., Ordinary	8/3	8/6
Greenwood & Batley, Ltd., £10 ordinary	9	10
Humber, Ltd., 6% cum. pref. £1	17/-	18/-
Humber, Ltd., £1 ordinary	17/-	18/-
Napier (D) & Son, Ltd., 7½% cum. pf. £1	18/-	18/6
Peter Hooker, Ltd., £1 ordinary ...	21/-	22/-
Peter Hooker, Ltd., 7% cum. partic. 1st pref.	20 -	21/-
Rolls Royce, Ltd., £1 ordinary	57/6	58/6
Rudge Whitworth, Ltd. £1 ordinary ...	43/-	44/-
Ruston, Proctor & Co., Ltd. £1 ordinary	26/-	27 -
Ruston, Proctor & Co., Ltd. 5% cum. pref. £1 ...	17/-	17/6
Sunbeam Motor Car Co., Ltd., £1 ord...	86/-	87/-
Straker Squire, Ltd. (1913), £1 ordinary	23/-	24/-
S. Smith & Son, Ltd. (Motor Accessories) £1 ordinary	26/-	27/-
Triplex Safety Glass, £1 ordinary... ...	22/-	23/-
Vickers, Ltd., 5% pref. stock...	78	82
Vickers, Ltd., 5% pref. shares. £1 ...	17/-	18/-
Vickers, Ltd., £1 ordinary	39/-	40/-
Wm. Beardmore & Co., Ltd., 6% c. pf. £1	19/-	19/6

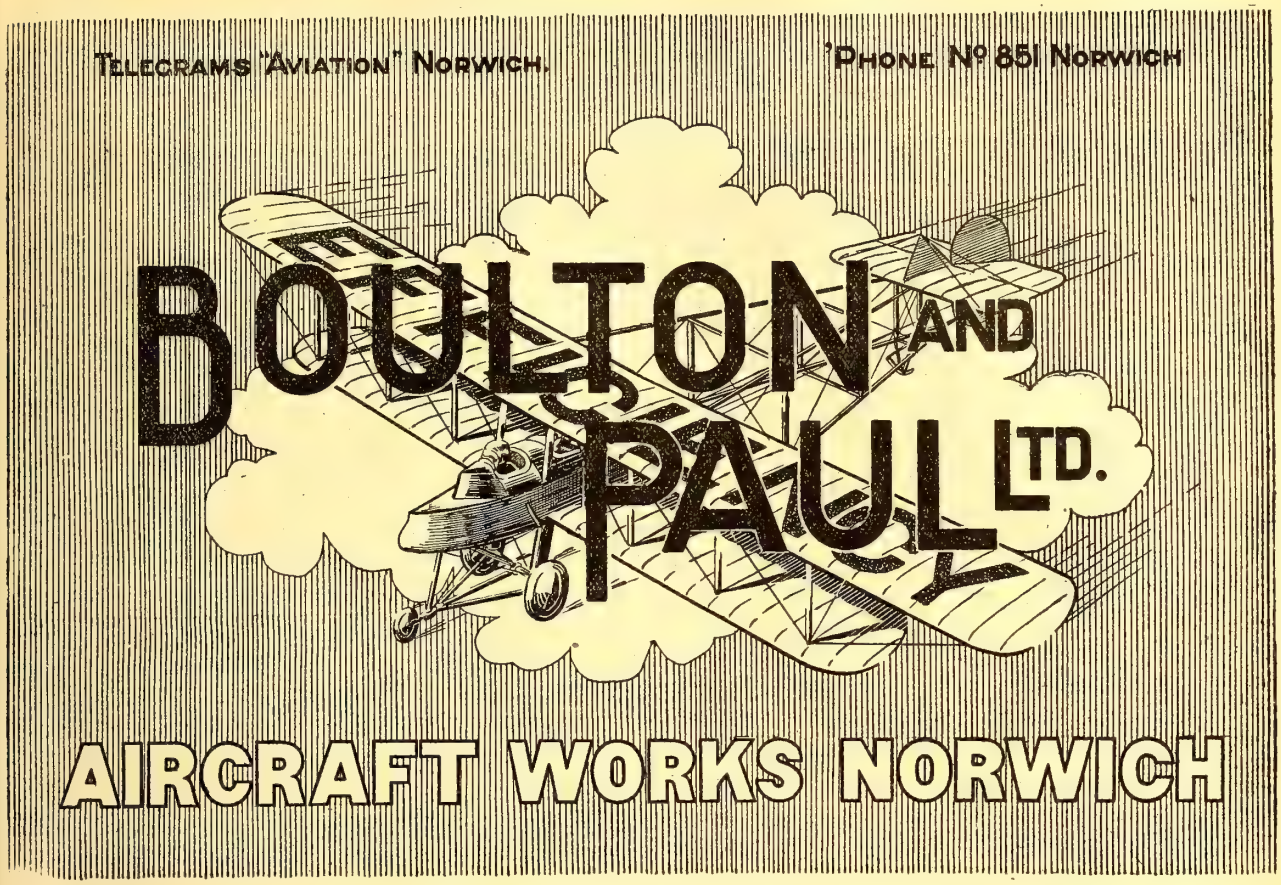
GENERAL INFORMATION.

Armstrong, Whitworth (1916).
Austin Motor (1916).
B'ham. Small Arms (1915-16).
Rolls Royce.
Rudge Whitworth.
Straker-Squire (1915).
Sunbeam Motor.
Thorneycroft (J. I.) & Co.
Vickers (1915 and 1916).

Owing to the difficulty of estimating liabilities under Finance and Munitions Acts, the accounts will not be ready until a later date.

x = ex dividend.

October 30, 1917.



GWYNNES
LIMITED

CONTRACTORS TO H.M. ADMIRALTY AND WAR OFFICE.

SOLE LICENSEES AND MANUFACTURERS IN THE BRITISH EMPIRE OF THE

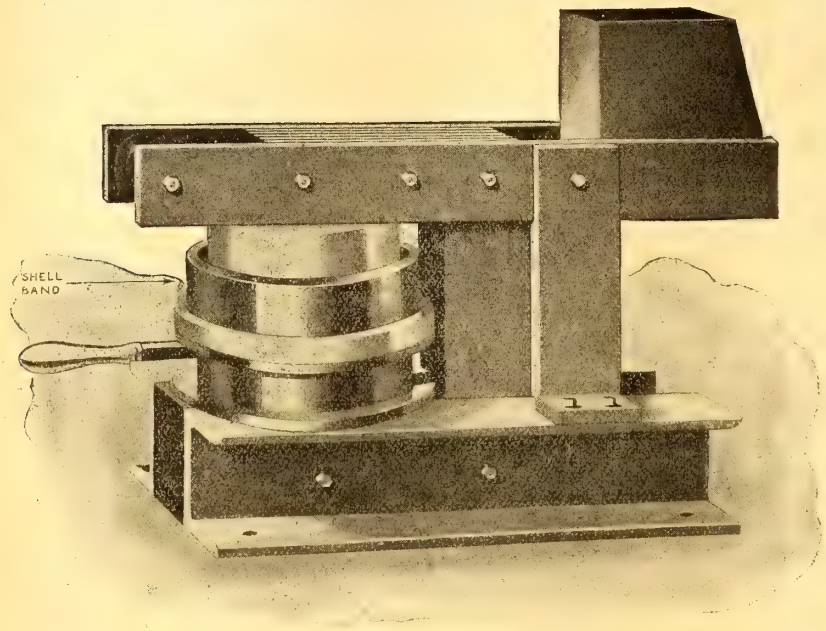
"CLERGET" PATENT AERO ENGINES.

WORKS & OFFICES: { CRISP ROAD, HAMMERSMITH, W.6. / CHURCH WHARF, CHISWICK, W.4. } LONDON.

TELEPHONES: 1910 HAMMERSMITH (3 lines. 1780 CHISWICK 3 lines).

TELEGRAMS: "GWYNNE, LONDON."

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.



SHELL-BAND HEATING TRANSFORMER

(Patent No. 7187-1916.)

for heating Copper Shell-Bands, from 6 to 13 5in., by Electric Power

The quickest, cheapest, cleanest and safest method. In use by many large munition works. Ask for Leaflet T1/22.

Transformers for Power (List P).

Transformers for Wireless Telegraphy.

Testing Transformers up to 250,000 Volts.

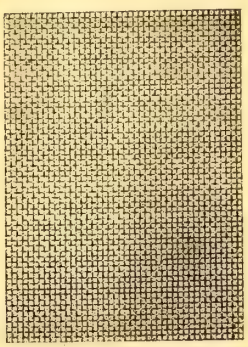
We also manufacture
Electric Cables of every kind.
Switchgear, A.C. and D.C.
Motors and Dynamos,
Lamps and Lighting Fittings.

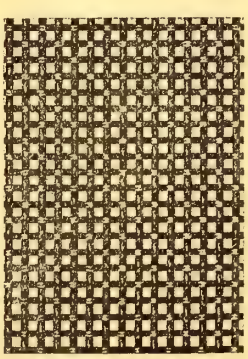
Contractors for Electrification of Works.

JOHNSON AND PHILLIPS LTD
CHARLTON, LONDON, S.E.

And 12, UNION COURT, OLD BROAD ST., E.C.2.

BIRMINGHAM, 206, Corporation St. CARDIFF, 9, Park Pl. GLASGOW, 159, W. George St. MANCHESTER, 251, Deansgate.
NEWCASTLE-ON-TYNE, 44b, Blackett St. PORTSMOUTH, Cleveland Rd., Gosport.





AIR BOARD STANDARD PETROL GAUZE.

WOVEN WIRE CLOTH
IN ALL METALS AND
IN ALL MESHES AND STRENGTHS.

MANUFACTURED BY

N. GREENING & SONS, LTD. ESTABLISHED 1799.

LONDON WAREHOUSE—

16 FINSBURY STREET, E.C.2.

Telegrams—"SETSCREW, FINSQUARE, LONDON."
Telephone No.—LONDON WALL 1082.

WORKS - WARRINGTON.

(*Continued from page* 1254.)

Sec. Lt. A. C. Yodale, M.C., R.F.C., Spec. Res. (M.C. gazetted Sept. 26th, 1917.)

THE MILITARY CROSS.

Temp. Sec. Lt. R. H. Ayre, Gen. List and R.F.C.
Sec. Lt. (temp. Capt.) C. A. Brewster-Yoske, Gen. List and R.F.C.
Sec. Lt. (temp. Lt.) J. H. Broadway, Dorset. R., Spec. Res., attd. R.F.C
Temp. Sec. Lt. G. W. Ferguson, Gen. List and R.F.C.
Sec. Lt. (temp. Capt.) A. Gray, Arg. and Suth'd Highrs. and R.F.C.
Temp. Sec. Lt. R. F. Hill, Gen. List and R.F.C.
Sec. Lt. C. F. Horsley, Norf. R. and R.F.C.
Temp. Capt. J. Leacroft, Gen. List and R.F.C.
Temp. Lt. H. G. E. Luchford, Gen. List and R.F.C.
Sec. Lt. (temp. Lt.) F. L. McCreary, S. Lan. R. and R.F.C.
Temp. Lt. T. T. S. Menendez, Gen. List and R.F.C.
Lt. (temp. Capt.) M. D. G. Scott, N. Lan. R., Spec. Res., and R.F.C.
Capt. W. Smith, Lon. R. and R.F.C.
Sec. Lt. C. A. Stevens, W. Rid. R. and R.F.C.
Sec. Lt. R. Winnicott, Devon. R. and R.F.C.

CANADIAN FORCE.

Lt. A. G. Goulding, Infy. and R.F.C.

WAR OFFICE, Oct. 29th.

REGULAR FORCES.—STAFF.—The following temp. appts. are made at the War Office.—Dir.-Gen. of Mil. Aeronautics.—Bt. Lt.-Col. (temp. Maj.-Gen.) J. M. Salmond, C.M.G., D.S.O., R. Lanc. R., and to retain his temp. rank whilst so empld., vice Lt.-Gen. Sir D. Henderson, K.C.B., D.S.O., Oct. 18th.

Staff Capts.—Lt. (temp. Maj.) H. G. Gold, R.F.C., Spec. Res., from a spec. appt. (graded as a Park Comdr.), to relinquish the rank of temp. Maj., and to be temp. Capt. whilst so empld., Oct. 8th.

ESTABLISHMENTS.—R.F.C.—MIL. WING.—Wing Comdr.—Lt. (temp. Maj.) A. T. Watson, Spec. Res., from a Sqdn. Comdr., and to be temp. Lt.-Col. whilst so empld., Oct. 1st.

Flt. Comdrs.—From Flying Officers, and to be temp. Capts. whilst so empld. :—Sec. Lt. (temp. Lt.) C. E. Saunders, Gord. Highrs., T.F., Oct. 12th. Temp. Lt. D. B. King, Gen. List; Sec. Lt. C. E. Barrington, R.A.; temp. Sec. Lt. R. E. G. Fulljames, Gen. List, Oct. 15th.

Adjt.—Maj. J. W. F. W. Ashby, R. Suss. R., T.F., from an Equipment Officer, 3rd Cl., Oct. 10th.

Equipment Officer, 1st Cl.—Temp. Capt. R. F. Stapleton-Cotton, Gen. List, from a Flt. Comdr. (Oct. 18th, seny. without pay or allowances Feb. 18th).

FROM THE COURT CIRCULAR.

BUCKINGHAM PALACE, Oct. 23rd.

Major-General J. M. Salmond (Director-General of Military Aeronautics) had the honour of being received by the King this morning.

BUCKINGHAM PALACE, Oct. 24th.

The following had the honour of being received by the King.

Major General E. B. Ashmore (General Officer Commanding Air Defence).

BUCKINGHAM PALACE, Oct. 25th.

The following Officer had the honour of being received by His Majesty :—

Sec. Lt. L. A. Wingfield, Royal Fusiliers, attd. R.F.C.

BUCKINGHAM PALACE, Oct. 29th.

Captain R. J. Tipton (Royal Flying Corps) had the honour of being received by His Majesty.

NAVAL.

The following appointments have been made in the Royal Naval Air Service :—

OCT. 25th.—Mr. H. G. Harrison, granted temp. commission as Lt. (R.N.V.R.), seny. Oct. 23rd.

OCT. 29th.—Flt. Sub-Lt. (temp.).—E. O. D. Crean, promoted to Flt. Lt. (temp.), seny. Oct. 1st.

Temp. commissions as Lt. (R.N.V.R.) have been granted to A. de Bear, R. Tyler, and J. S. Watson, seny. Oct. 27th.

ADMIRALTY COMMUNIQUÉS.

OCT. 23rd.—On the night of Oct. 21st-22nd naval aircraft carried out a bombing raid on Melle railway sidings near Ghent. Several bombs were dropped on the objective.

During the afternoon of Oct. 22nd a bombing raid was attempted on St. Denis Westrem aerodrome, south-west of Ghent, but owing to very thick clouds our machines dropped their bombs on Zeebrugge Mole. Two small vessels alongside were hit, and bombs burst close to seaplane base and buildings on mole.

All our machines returned safely.

OCT. 27th.—During the afternoon of the 26th inst, bombing raids were carried out by naval aircraft on Varssenaere aerodrome and on Thourout railway junction. Bad weather conditions rendered observation difficult.

All our machines returned safely.

OCT. 28th.—On the night of Oct. 26th-27th bombs were dropped by the Royal Naval Air Service on Lichtervelde railway junction, direct hits causing a heavy explosion, followed by numerous smaller ones.

Thourout railway junction was also attacked, the bombs falling close to a moving train, which stopped at once, a large explosion being observed.

In addition, Cortemarck railway junction was bombed.

During the afternoon of Oct. 27th bombing raids were carried out on Sparappelhoek aerodrome, on Engel aerodrome, and on the Ostend-Thourout railway line south of Engel.

A great number of patrols were carried out. Two enemy aircraft were driven (? down) out of control, one of which fell in the sea.

All our machines returned safely.

Six British and French destroyers patrolling off the Belgian coast on the afternoon of Oct. 27th sighted and attacked three German destroyers and seventeen aeroplanes.

Two direct hits were obtained on the enemy's destroyers, which immediately retired under the protection of their land batteries.

The aeroplane formation was broken up by the anti-aircraft gunfire of our destroyers, each of the aeroplanes dropping three bombs in the vicinity of our vessels, which suffered no damage beyond two men being slightly wounded.

OCT. 29th.—On the evening of October 27th the Royal Naval Air Service carried out bombing raids on the following objectives :—(a) Enemy aerodromes at Engel and St. Denis Westrem; many tons of bombs were dropped close to sheds and railway line. (b) Railway junctions at Cortemarck and Lichtervelde; about two tons of bombs were dropped.

One of our machines failed to return.

At noon on October 28th the enemy aerodrome at Varssenaere was bombed. Direct hits on sheds were made.

During the same raid bombs were dropped on Stalhillebrugge station, near Bruges.

During the numerous patrols which have been carried out an enemy machine was shot down and seen to crash.

THE CASUALTY LIST.

Reported Oct. 25th.

WOUNDED.—Shook, Flt. Comdr. A. M., D.S.O., R.N.
Fox, Flt. Sub-Lt. W. N., R.N.
SLIGHTLY WOUNDED.—Stennett, Obsr. Sub-Lt. W. R., R.N.
ACCIDENTALLY INJURED.—Maynard, Flt. Comdr. F. H. M., R.N.
Cumming, Flt. Sub Lt. H. W. M., R.N.

Reported Oct. 26th.

ACCIDENTALLY KILLED.—Crawford-Wood, Prob. Flt. Officer J. P., R.N.
Oxley, Prob. Obsr. Officer K. L. C., R.N.
CORRECTION.—Eyre, Actg. Flt. Comdr. C. A., R.N. (presumed killed).—The rank of this Officer should be as now described, and not as previously reported.

Reported Oct. 29th.

MISSING.—Hough, Flt. Sub-Lt. J. E. C., R.N.
ACCIDENTALLY KILLED.—Sugars, Prob. Flt. Offr. B. E., R.N.
PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—de Wilde, Fl. Sub-Lt. J. S., R.N.
PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONERS.—Foster, Flt. Sub-Lt. E., R.N.
Akester, Flt. Sub-Lt. J. C., R.N.

PERSONAL NOTICES.

DEATHS.

BRANDON.—At Minster, Isle of Thanet, on Oct. 27th, an inquest was held concerning the death of Flt. Lieut. Arthur Frank Brandon, R.N., who was killed by a collision in the air on the previous evening. Evidence was given that Lieut. Brandon had been acting as instructor in a formation flight in the afternoon. Later he went up alone to test engines. When 500 feet up another machine descending to the aerodrome struck his right wing from above, sending him crashing to earth. The pilot of the second machine was flying a broad-winged machine, which made it impossible for him to see anything underneath. A verdict of death by misadventure was returned. Lt. Brandon, was a skilled aviator, and accounted for a Gotha brought down during a recent air raid on the South-East Coast.

WOOD.—Flight Sub-Lieut. Peter Crawford Wood, R.N., who was killed while flying on October 23rd, was only surviving son of Mr. J. Crawford Wood, of Alkerton House, near Banbury, Oxfordshire. He had seniority of July 30th, 1916.

ENGAGEMENTS.

SMITH—CUBITT.—The engagement is announced between Flt. Comdr. C. H. Chichester Smith, D.S.C., R.N., younger son of Mr. and Mrs. C. J. Smith, late of Budleigh-Salterton, and Exeter, Devon, and Norah, second daughter of Mr. and Mrs. W. P. Cubitt, of Bacton Abbey, Norfolk.

WEEKS—GARTHWAITE.—An engagement is announced between Flt. Sub-Lt. Reginald V. Weeks, R.N., elder son of Mr. and Mrs. E. V. Weeks, of Fairlight, St. Peter's Road, South Croydon, and Norah, fourth daughter of Mr. J. R. Garthwaite, M.I.N.A., and Mrs. Garthwaite, of Glenholme, Mandale, Thornaby-on-Tees, Yorks.

Birth.

ALDWELL.—On Oct. 21st, at the Rectory, Ratcliffe-on-Wreake, Leicester, the wife of Wing Comdr. Gerald W. S. Aldwell, R.N., of a daughter.

MILITARY.

G.H.Q. Communiqués.

Oct. 23rd, 9.20 p.m.—On the 22nd instant the weather broke, almost preventing flying until the afternoon.

In spite of the rain and bad visibility, our aeroplanes worked with our infantry in their attack, continuously reporting their progress and assisting them with machine-gun fire. A large number of rounds were fired at ground targets, including hostile machine-gun emplacements and hostile troops in shell holes, on the march, and in villages.

Many bombs were dropped by day on hostile billets and hutments, as well as on German infantry in shell holes and trenches.

During the last few nights the enemy has dropped a good many bombs in our forward areas, but last night his machines were not nearly so active except in the neighbourhood of Dunkirk.

As soon as it was dark our aeroplanes vigorously attacked seven enemy aerodromes. The bombs fell near hangars and aeroplanes which were out on the ground.

Late in the night Courtrai railway station was attacked. A train was hit and the rear portion of it burst into flames.

There was little fighting during the day. Two enemy machines were brought down.

Two of our machines collided in the air over the enemy's lines, and one other of our aeroplanes is missing.

Oct. 24th, 9.5. p.m.—The weather is wet and stormy.

On the 23rd inst. the weather was unfavourable for flying, and nothing of special interest to report occurred in the air.

One of our aeroplanes reported missing on the 21st inst. has since been located. The pilot of the machine is slightly wounded.

Oct. 25th, 10.5 p.m.—Last night the factories and railway communications in the vicinity of Saarbrücken were attacked by our aeroplane squadrons with excellent results.

Over three and a half tons of explosives were dropped on the Burbach works, just west of Saarbrücken, by Naval machines. The damage caused was considerable, and many fires were observed.

Three thousand three hundred and thirty-five pounds of explosives were dropped on the railway stations, junctions, and goods sidings in and around Saarbrücken by another squadron. Many direct hits were obtained, resulting in numerous explosions.

One train proceeding to Saarbrücken received a direct hit from a big bomb, and was destroyed. A total of five tons of explosives were dropped by us.

The enemy's anti-aircraft defences were strong.

At first the weather conditions were good, but later they became very bad, with rain, low clouds, and strong wind rendering the return of our machines most difficult.

On the 24th inst. there was a slight improvement in the weather on the British front, though thick, drifting clouds and a very strong west wind made observation and fighting over the enemy's lines difficult.

One hundred and fifty-four bombs were dropped during the day on the enemy's billets, twelve heavy bombs on an aerodrome near Courtrai, and 71 others on German troops in trenches and in the open.

At times fighting was severe. Four hostile machines were brought down by our aeroplanes, and one was shot down by our infantry. Three other German machines were driven down out of control.

Six of our aeroplanes are missing.

Oct. 26th, 10 p.m.—During the raid into Germany, carried out by our aeroplanes on the night of the 24th-25th inst., another ton of bombs was dropped on the Burbach Works, west of Saarbrücken, in addition to the 3½ tons already reported, making a total of six tons of bombs dropped in the course of the night's operations.

Three of the machines which took part in the raid are missing.

On the 25th inst. the weather was impossible for flying during the day, but at nightfall the sky cleared for a few hours, and our bombing machines left the ground and attacked four hostile aerodromes. Forty-five heavy bombs were dropped, and in one case a direct hit was obtained on a group of hangars.

Before all of our machines had returned the weather suddenly became bad again, and those of our areoplanes which were still out had great difficulty in reaching their aerodromes.

One machine has not returned.

Oct. 27th 9.22 p.m.—On the 26th inst. rain fell most of the day. In spite of this our aeroplanes went out and performed valuable work, locating our attacking infantry and reporting suitable targets to our artillery.

Aeroplanes, flying at a low altitude, fired 10,000 rounds from their machine-guns on hostile troops endeavouring to repair wire, on the enemy's horse and mechanical transport on roads, and on his infantry on the march and in shell-holes.

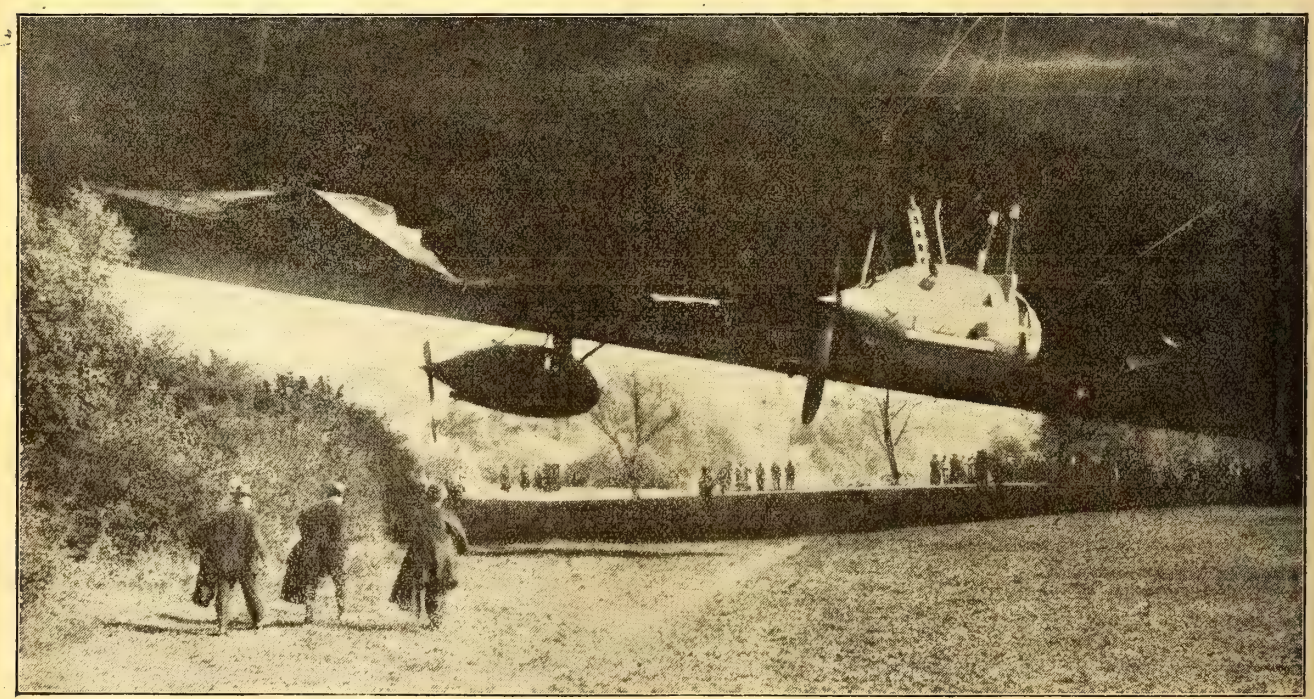
Two of our machines flew down the main streets of a town at the level of the housetops firing at bodies of hostile troops.

Some fighting took place at low altitudes, in which three German machines were brought down and one was driven down out of control.

Two of our machines are missing.

Oct. 28th, 9.15 p.m.—On the 27th inst. large numbers of our own and the enemy's aeroplanes were out from early morning until dark; a great deal of artillery work was done by our machines, and several thousand rounds were fired from heights ranging between 100 feet and 1,000 feet at hostile targets on the ground.

During the day 29 heavy bombs were dropped on Roulers Station, six on Abeele aerodrome, 121 lighter bombs on hostile



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billets east of Lens, and 124 on other targets opposite the battle front.

As soon as it was dark our night flying squadrons continued the bombing, and dropped over four tons of bombs on seven of the enemy's aerodromes and on three important railway stations. Several bursts were observed near hangars and on the railway tracks, while one bomb fell on a train, setting it on fire.

The enemy's fighting machines were very active and aggressive, making repeated attacks on our bombing machines, which, none the less, never failed to reach their objective.

In air fighting eleven hostile machines were brought down, and seven others were driven down out of control.

Nine of our machines are missing.

Oct. 29th, 9.20 p.m.—On the 28th inst., although the weather was fine, a thick haze hung over the lines, greatly hindering work in the air.

Our low-flying aeroplanes fired a great many rounds at the enemy's troops in his trenches and in shell holes.

During the day over a hundred bombs were dropped by us on hostile aerodromes and billets. At night Gontrode aerodrome and Courtrai station, and billets and railway stations in the neighbourhood of Roulers were bombed.

There was not much fighting owing to the mist. One German machine was brought down, and one was driven out of control.

One of our machines is missing.

Home Command Communiqués.

Oct. 23rd.—The total casualties which occurred in all districts visited by raiding airships on the night of Oct. 19th-20th amounted to: Killed 34, injured 56.

Oct. 29th, 11.25 p.m.—Hostile aeroplanes attempted to raid the South-East Counties to-night.

Our aeroplanes went up and guns and lights were in action.

No hostile aeroplane succeeded in passing the outer defences.

The Casualty List.

Reported Oct. 24th.

Killed.—Heald, Sec. Lt. T. P., R.F.C.
Died of Wounds.—Clarke, Lt. F. C. E., Worc. R., attd. R.F.C.
Mighell, Lt. P., R.F.C.
Wounded.—Dore, Sec. Lt. G. L., R.F.C.
Hiscock, Lt. F. H., R.F.C.
Minchin, Capt. J. H. C., Sco. Rif., attd. R.F.C.
Vandyk, Sec. Lt. C. G., R.F.A., attd. R.F.C.
Missing.—Allen, Sec. Lt. A. A., R.F.C.
Armstrong, Sec. Lt. G. W., R.F.C.
Atkinson, Lt. J. M., A.S.C., attd. R.F.C.
Cobb, Sec. Lt. R. J. P., D. of Well. R., attd. R.F.C.
Coomber, Capt. H. B., Manch. R., attd. R.F.C.
Gilbert, Sec. Lt. R. S., R.F.C.
Hicks, Sec. Lt. H. R., R.F.C.
Matthewson, Sec. Lt. R. W. B., R.F.C.
Morgan, Sec. Lt. W. G., R.F.C.
Newcomb, Sec. Lt. M., R.F.C.
Pughe-Evans, Sec. Lt. H., Welsh R., attd. R.F.C.
Smithett, Sec. Lt. G. C. E., North'n R., attd. R.F.C.
Talbot, Sec. Lt. F. W., Worc. R., attd. R.F.C.
Turvey, Sec. Lt. A. E., R.F.C.
Willard, Sec. Lt. K. H., Y. and L.R., attd. R.F.C.
Winter, Sec. Lt. W. H., R.W. Surr. R., attd. R.F.C.

Reported Oct. 25th.

Missing.—Gibbes, Sec. Lt. F. W., R.F.C.
Norton, Sec. Lt. P. C., R.F.C.
Salter, Sec. Lt. J. H. K., R.F.C.
Vick, Sec. Lt. W. W., R.F.C.

Reported Oct. 26th.

Killed.—Adams, Sec. Lt. J. P. F., Durh. L.I., attd. R.F.C.
Macpherson, Sec. Lt. H. D., R.F.C.
Wounded.—Dreschfield, Sec. Lt. S. E., R.F.C.
Duncan, Lt. J., R.F.A., attd. R.F.C.
Missing.—Braithwaite, Sec. Lt. B. F., R.F.C.
Garrett, Sec. Lt. J. C., R.F.C.
Ward, Sec. Lt. A. A., R.F.A., attd. R.F.C.
Indian Force.—Killed.—Sawyer, Sec. Lt. G. S., I.A.R.O., attd. R.F.C.

Reported Oct. 27th.

Killed.—Whitehead, Sec. Lt. G. N., R.F.C.
Wounded.—Malthouse, Lt. P. W., A.P.D., attd. R.F.C.
Missing.—Lord, Sec. Lt. T. V., R.F.C.
Wellby, Sec. Lt. H. S., Lond. R., attd. R.F.C.
Previously reported Missing, now reported Prisoner in German Hands.—Sutcliffe, Sec. Lt. A. L., S. Staff. R., attd. R.F.C.
Canadian Contingent.—Killed.—Cook, Lt. H., Sask. Regt., attd. R.F.C.
Died of Wounds.—McLeod, Lt. N., F.A., attd. R.F.C.
Accidentally Killed.—Thompson, Lt. W. C., Man. R., attd. R.F.C.
Missing.—Allen, Lt. S. H., Cent. Ont. R., attd. R.F.C.
Gould, Lt. L. H., B.C.R., attd. R.F.C.
Nasmyth, Lt. A. W., Alta. R., attd. R.F.C.
Smythe, Lt. C., M.C., F.A., attd. R.F.C.

Reported Oct. 29th.

Previously reported Missing, now reported Killed.—
Adams, Sec. Lt. J. H., N. Staff. R.
Brooks, Capt. C. A., Wilts. R., attd. R.F.C.
Farnes, Sec. Lt. H. C., K.R. Rif. C., attd. R.F.C.
Mall Smith, Lt. G. E., M.C., R.F.C.
Pearson, Sec. Lt. A. J., M.C., R.F.C.
Died of Wounds.—Campbell, Sec. Lt. W. A., W. Yorks. R., attd. R.F.C.
Gadsden, Sec. Lt. C. C., R.W. Surr. R., attd. R.F.C
Olivier, Lt. H., R.F.C.
Veacock, Lt. S. J., Hamps. R., attd. R.F.C.
Died.—Jones, Sec. Lt. H. E., R.F.C.
Wounded.—Bennett, Lt. J. E., Yeo., attd. R.F.C.
Bremner, Sec. Lt. J. F., R.F.C.
Dowse, Sec. Lt. H. H., A.S.C., attd. R.F.C.
Gartside, Lt. J. T., R.F.C.
Grant, Sec. Lt. F. D., R.F.C.
White, Sec. Lt. F. E., R.F.C.
Missing.—Ortweiler, Sec. Lt. F. J., R.F.C.
Wookey, Sec. Lt. H. C., Glouc. R., attd. R.F.C.
Previously reported Missing, now reported Wounded and Prisoner in German Hands.—Uniacke, Sec. Lt. D. P. FitzG., R. Ir. Rif., attd. R.F.C.
Previously reported Missing, now reported Prisoners in German Hands.—Baynton, Sec. Lt. G. R., R.F.C.
Cooke, Sec. Lt. E. A., R.F.C.
Hatfeild, Capt. A. C., R.F.C.
Lomax, Sec. Lt. C. N. L., R.F.C.
McGregor, Sec. Lt. R. R., R. Scots, attd. R.F.C.
Murray, Lt. P. W., Durh. L.I., attd. R.F.C.
Nobbs, Sec. Lt. C. H. F., R.F.C.
Robertson, Sec. Lt. G. P., R.F.C.
Rothery, Sec. Lt. H., R.F.C.
Stuart, Sec. Lt. C. E., R.F.C.
Sutcliffe, Sec. Lt. C. A., R.F.C.

Reported Oct. 29th.

Killed.—Cremonini, Sec. Lt. J. H., R.F.C.
Previously reported Missing, now reported Killed.—
Battersby, Lt. P. W., Yeo., attd. R.F.C.
Truscott, Sec. Lt. F. G., M.C., Suff. R., attd. R.F.C.
Wounded.—Crossland, Lt. E. F., R.F.C.
Missing.—Forbes, Sec. Lt. G. W., R.F.C.
Fosse, Sec. Lt. E. L., R. War. R., attd. R.F.C.
Lennox, Sec. Lt. A. D., R. Sco. Fus., attd. R.F.C
Gilbert, Lt. J. D., Yeo., attd. R.F.C.
Patch, Capt. H., S. Lan. R., attd. R.F.C.
Scholtz, Sec. Lt. E., R.F.C.
Stanley, Sec. Lt. S. E., R.F.C.

* * *

Casualties among Warrant Officers, N.C.O.'s and Men.

The dates are those of the official list.

Killed.

Oct. 18th.—R.F.C.—Loveland P/305201 2nd Cl. Air Mech. C. (Erdington).
Oct. 19th.—Cox 69279 3rd Cl. Air Mech. U. (Daventry); Friend 65309 1st Cl. Air Mech. H. (Lewisham, S.E.); Hogg 7470 1st Cl. Air Mech. C. H. K. (Newark).

Died of Wounds.

Oct. 15th.—R.F.C.—Hellier 22580 2nd Cl. Air Mech. F. (Stoke-under-Ham).
Previously reported Died, now reported Died of Wounds.
Oct. 20th.—R.F.C.—Payne 19737 1st Cl. Air Mech. J. W. (Margate).

Accidentally Killed.

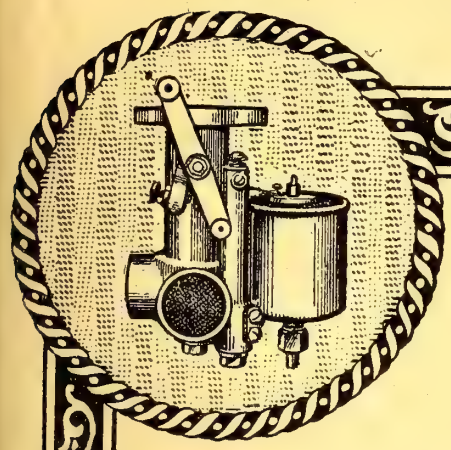
Oct. 16th.—R.F.C.—Bailey 18729 1st Cl. Air Mech. L. K. H. (Addiscombe).
Oct. 19th.—Muscutt 88146 2nd Cl. Air Mech. J. H. (Hanley).

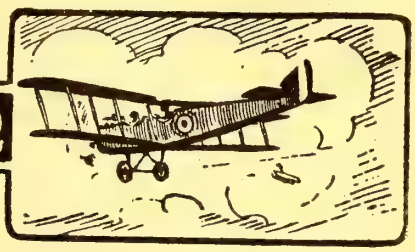
Died.

Oct. 18th.—R.F.C.—Abbott 65535 1st Cl. Air Mech. E. L. (Kendall).
Oct. 19th.—Mansell 45171 2nd Cl. Air Mech. W. H. (Prestatyn).

Wounded.

Oct. 15th.—R.F.C.—Laycock 44988 2nd Cl. Air Mech. F. A. (Wembley); Scott 94315 2nd Cl. Air Mech. F. (Newcastle-on-Tyne).
Oct. 16th.—Handyside 83111 2nd Cl. Air Mech. D. (South Leith); Skidmore 61121 2nd Cl. Air Mech. W. (Easton, Bristol).
R.F.C., attd. R.F.A.—Newbury 8234 2nd Cl. Air Mech. A. (Thornton Heath).
Oct. 18th.—R.F.C.—Kimpton 523 Cpl. E. F. (Walthamstow, E.); Parsons 62217 2nd Cl. Air Mech. M. (Brighton).
R.F.C., attd. R.G.A.—Cox 9905 1st Cl. Air Mech. B. E. (Worcester); Fergusson 77363 2nd Cl. Air Mech. B. (Maidstone); Heddon 44740 2nd Cl. Air Mech. W. J. (Carmarthen).
Oct. 19th.—R.F.C.—Blanksby 66470 2nd Cl. Air Mech. H. (Spital, Chesterfield); Drewitt 54268 1st Cl. Air Mech. L. (Wandsworth, S.W.); Fox 65034 2nd Cl. Air Mech. N. H. (Westcliff); Moore 8634 1st Cl. Air Mech. J. G. F. (Pinner);

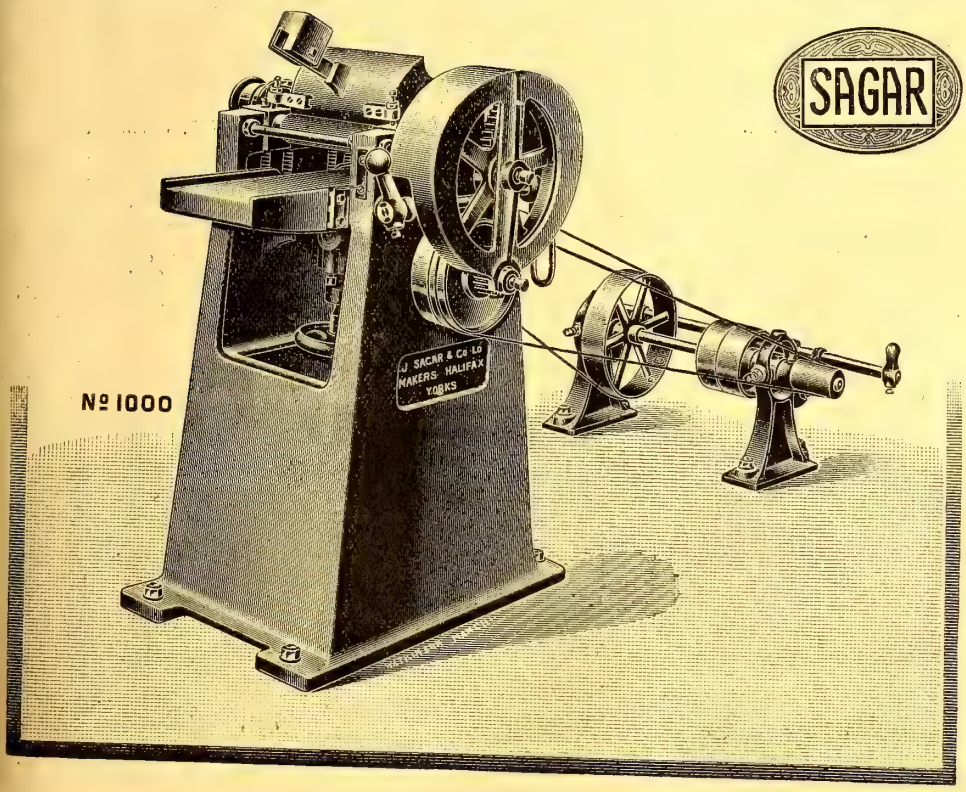




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Roberts 2086 Sjt. W. (Elton, Bury); Roberts 49874 2nd Cl. Air Mech. A. E. (Battersea, S.W.).

Oct. 20th.—Poulton 55205 2nd Cl. Air Mech. A. T. (Finchley, N.); Walker P/382428 2nd Cl. Mech. W. (Hull).

R.F.C., attd. R.F.A.—Wagstaffe 8863 2nd Cl. Air Mech. R. T. (Derby).

Missing.

Oct. 16th.—Grant 46448 Act. Cpl. O. W. A. (Hythe).

R.F.C.—Lambeth 88285 Sjt. G. E. (Snodland).

Oct. 19th.—Bancroft, 19130 Sjt. J. (Carrington); Goss 1391 Cpl. L. S. (Putney, S.W.); Marshall 9253 Cpl. E. (Kettering).

Previously reported Wounded, now reported not Wounded.

R.F.C., attd. R.F.A.—Radbourne 11300 2nd Cl. Air Mech. H. J. (Putney, S.W.).

Previously Missing, now reported by the German Government Killed or Died of Wounds.

Oct. 20th.—R.F.C.—Walker 28707 2nd Cl. Air Mech. J. C. (Rutherglen).

* * *

The following is reported Prisoner of War in list received from the German Government:—

Previously reported Missing, now reported Prisoner of War.

Oct. 18th.—R.F.C.—Hawkins 46209 2nd Cl. Air Mech. W. (Minehead).

* * *

The following reports have been received from various sources:—

Prisoner of War in German Hands.

Oct. 17th.—R.F.C.—Taylor 58038 2nd Cl. Air Mech. T. H. (Gloucester).

Previously reported Missing, now reported Prisoner of War in German Hands.

R.F.C.—Foulsham 87650 Sjt. H. S. (East Dulwich, S.E.).

Australian Imperial Force.

Wounded.

Oct. 20th.—A.F.C.—Morrison 577 D. V.; Ogier 767 E. E.

PERSONAL NOTICES.

Deaths.

ANDERSON.—Sec. Lieut. P. A. Anderson, R.F.C., who was killed in a flying accident at Turnhouse, Midlothian, N.B., on Oct. 19th, was the younger dearly-loved son of Mr. and Mrs. Frank Anderson, 74, Kimbolton Road, Bedford. He was 18 years of age.

BUTLER.—Lieut. Armar Somerset Butler, South Lancashire Regt., attached three years Wiltshire Regt., and recently R.F.C. (killed in action), was the third son of the Rev. Pierce Butler and Mrs. Pierce Butler, East Stoke Rectory, Wareham. He was 24 years of age.

Mr. Butler had served for two years in the Balkans, was recently severely wounded, and on his recovery volunteered for the R.F.C. He belonged to a distinguished military family, being grandson of the late General the Hon. H. E. Butler, a Peninsula hero and nephew of Major James Armar Butler, known as the "Hero of Silistria" at the beginning of the Crimean War.

CAMERON.—Sec. Lieut. George Grant Cameron, Gordon Highlanders, attached to R.F.C., who was killed on Oct. 16th in a flying accident, was the only son of the late G. L. Cameron, Earlswells, Bieldside, and Mrs. Cameron, 2, Forest Road, Aberdeen, and grandson of the late Mrs. Cameron, 20, Shaa Road, East Acton. He was 21 years of age.

DAWSON.—Lt. Harold W. Dawson, R.F.C., of Christchurch, New Zealand, was killed in a flying accident in France on or about October 9th. He was taking off in a heavy wind, and, on turning, about 300 feet up, the machine went into a spin and he was killed instantly. He promised to be a brilliant pilot, and in three weeks of service overseas he accounted for five enemy machines and did distinguished work on contact patrol. He left New Zealand with the N.Z.E.F., and transferred to the R.F.C. in March, 1917. He was 22 years of age.

FLEET. The Doncaster coroner held an inquest on Oct. 27th on the body of Sec. Lieut. Leonard Fleet, R.F.C., of Fallowfield, Manchester, and who was an electrical engineer in civil life. The officer was flying near Doncaster when the machine suddenly nose-dived to the ground. Death was instantaneous The jury returned a verdict of accidental death. Mr. Fleet was 22 years of age.

HERALD.—Sec. Lieut. Thomas Herald, R.F.C., who was accidentally killed at Yateshury, Wilts, on Oct. 20th, was the only son of Mr. and Mrs. Thomas Herald, of Glasgow.

HOMER and McGILL.—At the inquest on Oct. 27th on the bodies of Lieut. Charles William Homer, R.F.C., an instructor, and Lieut. Douglas McGill, R.F.C., a pupil, who were killed in Norfolk on that day whilst flying, the jury returned a verdict of accidental death in each case. Capt. J. M. Robb, squadron commander R.F.C., said that Mr. McGill was making his first flight with Mr. Homer, who was fully qualified and an excellent pilot. Capt. Langford George Davies, R.A.M.C., said he saw the machine coming down rather steeply, and when about 300 feet up the right wing of the machine seemed to bend and the machine disappeared beyond the rise. He went to the scene, and found both men were dead. They must have been killed instantaneously. Major Orton said he thought the machine got into a spinning nose-dive and landed upside down.

Mr. Homer was the son of Mrs. Miller, Pinewood, Maidenhead, and the husband of Mona Homer.

KEEBLE and HUDSON.—An inquest was held on Oct. 29th on the South-East Coast on the bodies of Sec. Lt. J. R. Keeble, R.F.C., aged 19, and Sec. Lt. Leslie Hudson, R.F.C., aged 20, of Kensington Gardens, London, who were killed in an aeroplane accident on Oct. 28th.

According to the evidence the machine rose to a height of about 400 ft., and in turning developed a spin, nose-dived to earth and broke into flames. Both aviators were dead when extricated. A witness expressed the opinion, if the pilot had had another 25 ft. to fall he would have pulled the machine out of the spin, and both men would have probably been alive to-day. A verdict of "Accidental death" was returned.

LEESON.—Lt. Alexander Neve Leeson, D.S.O., R.H.A., attached R.F.C., who was killed on Oct. 22nd, was the only son of Mr. and Mrs. Edward Leeson, of Mundesley, Norfolk. He was born in 1895, and was educated at Clifton Bank, St. Andrew's, Bengeo School, Hertford, and Rugby, where he was in the Army class and a cadet officer in the O.T.C. In August, 1914, he entered Woolwich, where he was under-officer, and was awarded the Tombs Memorial Prize. He got his commission in the R.F.A. in February, 1915, and joined his battery in Ireland. In July, 1915, he went to the Dardanelles with the 13th Division. He was invalided with scarlet fever to Mudros, rejoined his regiment in Egypt, and in February, 1916, went to another front. After several months of active service he was transferred to the R.H.A., and was awarded the D.S.O. Last August he became attached as an observer to the R.F.C.

LLOYD.—Lieut. David Rhys Cadwgan Lloyd, R.F.C., was killed on June 16th, aged 20. After passing through the O.T.C. at Oakham, he served in Belgium and France with the Essex Yeomanry in 1914, and with the Loyal North Lancashire Regiment in 1915 and 1916, when he was wounded at the battle of the Somme. He joined the R.F.C. the same year. His C.O. wrote:—"Every one in the squadron liked your son immensely. He was a fine and fearless pilot—almost the best in the squadron—and an undeniable fighter. I miss him dreadfully." Lieut. Lloyd was the younger son of Mr. and Mrs. Llewelyn Lloyd, of Kirby-le-Soken, Essex.

PEMBERTON.—Capt. Frederick Despard Pemberton, R.F.A. and R.F.C., who was formerly reported missing and is now known to have been shot dead from an enemy aeroplane on Aug. 21st, was the eldest son of Mr. and Mrs. F. B. Pemberton, of Mountjoy, Victoria, British Columbia. He was educated at Haileybury and the Royal Military College, Kingston, Canada. He received his commission in the R.F.A. during the summer of 1915, and on coming to England was attached to the R.F.C. in which his abilities as a skilful and courageous pilot earned him rapid promotion.

ROOPER.—Capt. W. V. Trevor Rooper, Yeomanry, attd. R.F.C., who was killed in the air on October 9th, was the youngest son of Mr. and Mrs. P. L. Rooper, of Poppy's Corner, Redhill, and formerly of The Elms, Gresford, Denbighshire. He was educated at Bilton Grange and Charterhouse, and enlisted in the Yeomanry on the outbreak of war, at the age of 17. After five months he was granted a commission in the Yeomanry, and was attached to the R.F.C. in September, 1916. He went to the front last April, and was gazetted captain and flight commander in August. He was 20 years of age.

The chaplain writes:—"I have never known anyone so universally liked, loved, and admired as your boy, not only by his squadron, but by all who came across him. . . . He was such a splendid type of character—a good sportsman, a gallant officer, and a thorough gentleman." An officer of his flight writes:—"We feel his loss enormously, but we feel proud that he gave his life so gloriously to save a comrade."

SHONE.—Lieut. Geoffrey Beville Shone, M.C., South Staffordshire Regt. and R.F.C., who was killed in action on Oct. 19th, was the eldest son of Herbert and Editha Grace Shone, The Bank House, Reigate. He was 23 years of age.

He joined the immortal 7th Division in March, 1915, being in charge of the Machine Gun Company of the South Staffords, and fought through Festubert, Loos, and Hulluch and Fricourt and Mametz. At Loos he gained the Military Cross. Joining the Royal Flying Corps in 1916, he returned to France in March of this year.

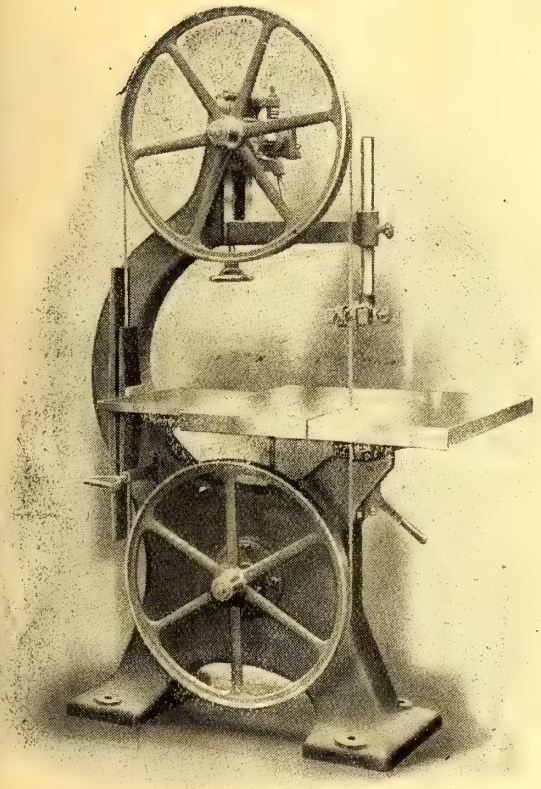
His Squadron Commander writes: "I had the highest possible opinion of your son, both as an officer and as a very skilful and bold pilot, and his death is a great loss to the squadron."

Mr. Shone, who was 23 years of age, received his promotion in the South Staffords in February, 1916, and was given his "wings" in the R.F.C. in the following November.

STEWART.—Lieut. A. D. Stewart, R.F.C., whose death was announced last week, was educated at Cheltenham College. In 1914 he was offered a post in the War Land Department, which

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he held until the present year, when, at his own request, he was transferred to the R.F.C. In 1914 he married Miss Dorothy Stella Adams, younger daughter of Mr. and Mrs. Sydney Adams, "The Heath," Petersfield. His second brother, Capt. Norman Stewart, Royal Scots, was killed at Hooge in September, 1915.

SWANN.—Sec. Lieut. Gerald Huddart Swann, R.F.C., killed on October 18th, aged 18, was the eldest son of Mr. and Mrs. Henry B. Swann, of Hangerfield, Witley, Surrey, and grandson of the late James Huddart, of Melbourne and London. He was educated at Cordwalles, Maidenhead, and Rugby, where he was for some years a member of the O.T.C., leaving from the sixth form in December last. He at once joined the R.F.C., and, obtaining his commission in May, proceeded to the front in August.

His commanding officer writes:—"He met his death in a glorious way in a long fight against great odds." A brother officer writes:—"He was in my flight, and, although he had not been out very long, he was absolutely loved by everyone. . . . He was the keenest officer I have had under me for a long time . . . I would like you to know that he died doing his job in a tremendous fight. . . ."

WHITEHEAD.—Sec. Lt. Geoffrey Nield Whitehead R.F.C., who was killed on Oct. 15th, was the third son of Mr. and Mrs. W. A. Whitehead, of Langley, Baildon, Yorks. He was educated at Shrewsbury and Christ Church, Oxford, and before joining the Army was associated with his father in the business of Messrs. W & J. Whitehead, New Lane Mills, Laisterdyke, Yorks.

A brother officer writes of him:—"We shall feel his loss very severely; he was an enthusiastic worker, with a very promising career. As an officer and a gentleman he maintained the dignity of the British Army in the highest degree, being respected and greatly admired by the men who came under him for his thoughtfulness for their welfare." He married, in 1913, Kathleen, daughter of the late W M. McLaren and Mrs. McLaren, of Bradford, and leaves a son.

WHYTEHEAD.—Sec. Lt. Hugh Holtom Whytehead, R.F.C., who was killed in action on July 12th, was the only son of the late Mr. Hugh Whytehead and Mrs. Whytehead, The Hermitage, Stratford-on-Avon. He was 21 years.

Engagements.

DE LAVISON—RAPP.—An engagement is announced between Lieut. Adrian de Lavison, London Regt., attached R.F.C., youngest son of the late Count de Lavison, of Cairo, and of Countess de Lavison, and grandson of Col. H. H. St. Leger, D.S.O., and Joyce Winifred Mary, elder daughter of Mr. and Mrs. Richard Rapp, of Elton Park House, Ipswich.

PURKESS—TYSOE.—An engagement is announced between Sec. Lt. James H. L. Purkess, Hampshire Regt., attd. R.F.C., son of the late James Purkess, general manager of the Midland and South-Western Railway, and of Mrs. Purkess, of Culmstock, Devonshire, and Miss Elizabeth Adeline (Ella) Tysoe, only daughter of the late Joseph Tysoe, M.Inst.C.E., and of Mrs. Tysoe, of Colwyn, Bleckheath, S.E.

TURNER—FARRAR.—The marriage arranged between Maj. Basil H. Turner, R.F.C., and Helen, eldest daughter of the late Sir George Farrar, Bt., D.S.O., will take place very quietly, owing to mourning in both families, at 2.30 on Thursday, Nov. 1st, at St. Luke's, Chelsea.

Marriages.

BURNEY-CUMMING—BODELL.—On Oct. 5th at Watton, Norfolk, Lt. J. C. Burney-Cumming, Gordon Highlanders and R.F.C., eldest son of Mr. and Mrs. Atherton Cumming, St. Albans, was married to Constance, youngest daughter of Lt. and Mrs. G. H. Bodell, Temple Gardens, Golders Green.

HUNT—SOAMES.—The marriage between Sec. Lt. William Ilan Vane Hunt, R.F.C., only son of the late the Rev. William Hunt, Senior Moderator, Trinity College, Dublin, and of Rathnapish, Co. Carlow, and Muriel, elder daughter of Mr. A. W. Soames, M.P., 18, Park Crescent, W.1, took place on Sunday, October 28th, at Holy Trinity Church, Marylebone.

KEITH—LEWES.—On Sept 12th, at the District Registry Office, and on Oct. 23rd, 1917, at the Parish Church, Folkestone, Sec. Lt. F. G. St. C. Keith, Royal Fusiliers, attd. R.F.C., was married to Florence, only daughter of J. H. Lewes, of Calcutta, by the Rev. Canon Tindall, M.A.

TYSOE—ROLLS.—On Oct. 20th, at Holy Trinity Church, Blackheath Hill, S.E., Lt. Harold Mayor Tysoe, Lancers, attd. R.F.C., elder son of the late Joseph Tysoe, Esq., C.E., and Mrs. Tysoe, Colwyn, Westcourt Park Road, S.E., was married to Stella Maud Ashby, elder daughter of Mr. and Mrs. Percy W. Rolls, of Blackheath, S.E., by the Rev. S. C. Donovan, Rector of East Horndon, Essex, uncle of the bride.

Births.

BAKER.—On Oct. 24th, at Acomb Hall, York, to the wife of Capt. Val. H. Baker, M.C., R.F.C., of Llanfairfechan, a son.

BURGESS.—On Oct. 28th, at "The Home," 117, The Ridgway, Wimbledon, the wife of Lt. J. E. Burgess, R.F.C., of a son.

HOARE.—On Oct. 20th, at a nursing home, the wife (née Needham) of Sec. Lieut. E. J. Downer Hoare, R.F.C.—a son.

LEGGO.—On Oct. 6th, to Lieut. and Mrs. A. E. Leggo, jun —a daughter. Of Rochdale, Vanduzi, Portuguese East Africa and R.F.C.

FRANCE.

Official Communiqués.

Oct. 23rd.—In spite of very unfavourable weather, our aviators in the most audacious fashion carried out the tasks assigned them, their machines flying at a height of only 160 feet above the lines.

Oct. 24th.—During the attack on Tuesday our aviators under most unfavourable conditions, and in spite of fog-clouds and strong wind, afforded our troops valuable aid from an early hour in the morning. The infantry attack was accompanied by our aeroplanes flying at heights of from 75 to 450 feet, and carrying the offensive beyond the objectives. Our chasing pilots attacked with machine-gun fire the enemy aeroplanes and columns of troops. Some of them flew at a height of 300 feet over Laon, and attacked trains in the station.

Our reconnaissance aeroplanes succeeded in getting above the clouds and reaching to a distance of 12½ miles behind the German lines, and obtaining important information. The aeroplane accompanying the infantry flew so low that some of them were obliged to protect their wireless installation from risk of fire. All of them were riddled with bullets fired from the ground. One was brought down in flames between the lines, and was subjected to machine-gun fire. Finally the aviators regained our lines, and immediately proceeded to transmit by telephone the information gained.

Oct. 25th.—German aviators have dropped two bombs on Nancy. There were no victims.

On Oct. 24th-25th enemy machines were brought down by our pilots or fell into their own lines out of control.

Oct. 27th.—In the evening of the 25th German aeroplanes dropped about twenty bombs of large calibre on Dunkirk. There are about thirty victims among the civilian population.

Oct. 29th.—German aeroplanes bombarded the region of Dunkirk on Oct. 27th and 28th. There were no casualties.

* * *

A message from Paris on October 23rd stated that in default of the body of the Zeppelin L49, the transport of which is impossible owing to the damage done to it, the gondolas, propellers and other interesting portions of the airship will shortly be conveyed to Paris and exhibited at the Invalides.

* * *

Contrary to general belief, says a message from Paris of October 24th, Zeppelin L50 did not descend voluntarily to land a portion of her crew. Lack of ballast caused her to get hooked on to the top of a wood. One of the gondolas caught in the trees and was torn away. The crew, however, did not wait for the ship to break away again, but promptly jumped out. What remained of the balloon then got carried away on a drifting course, and in a crippled state was lost in the fog.

* * *

A Reuter's message from Toulon on Oct. 27th says:—

Six days' searching has failed to produce any trace of the Zeppelin lost in the Mediterranean. From the information obtained, it appears that the Zeppelin was lost to view on Saturday at exactly 6.35 p.m., forty-five miles south of the Hyères Islands. Two aviators who pursued it, state that at the time mentioned they saw the Zeppelin dive nose downward into the sea and disappear.

GERMANY.

Official Communiqués.

Oct. 27th.—Italian Front.—Twenty-six aeroplanes have been brought down in the last two days.

Oct. 29th.—Since October 22nd the enemy has lost 48 aeroplanes in aerial engagements and by our anti-aircraft fire. Three of these were brought down in home territory.

Lt. Müller shot down his 30th and 31st, and Lt. von Bülow his 22nd and 23rd opponents.

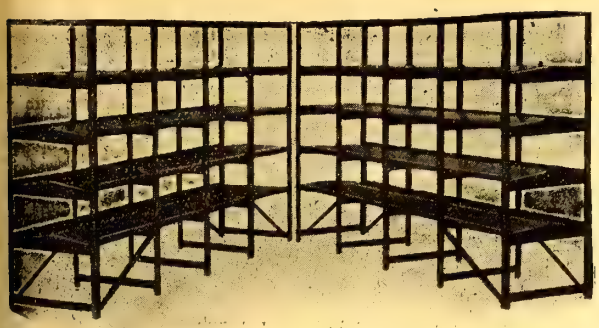
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The "Metzer Zeitung" officially reports that on October 21 a large enemy battle-aeroplane was shot down by a German battle aeroplane within the precincts of the fortress of Metz and the occupants were taken prisoners.

The journal also states that in the course of the air attack in the evening of October 21st five persons were killed and several Russian prisoners of war were slightly wounded.

* * *

The Berlin "Lokalanzeiger," of October 23rd, referring to the loss of the Zeppelins on French territory, maintains that their lo



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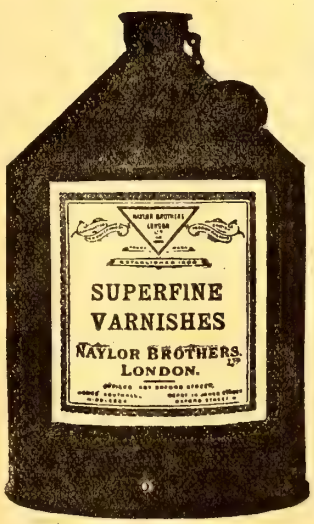
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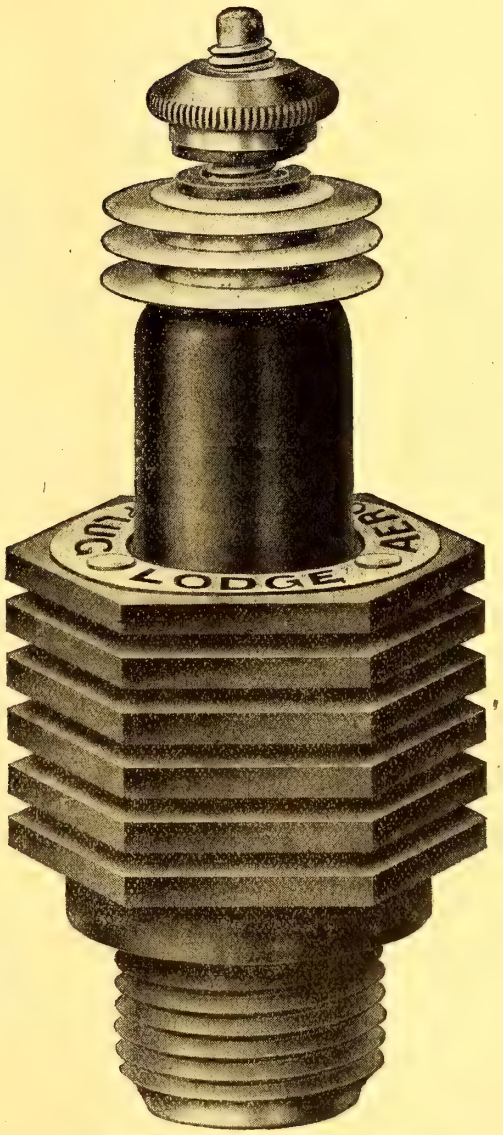
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was due to wind and fog, which was so dense that it was impossible for the airships to take any bearings. The journal adds: "That such was the case was evidenced by the fact that no airship was lost through the action of the English anti-aircraft guns or by attacks from English aviators."

* * *

A Berlin telegram states:—Several enemy air squadrons on the night of Oct. 24th attacked industrial districts of Lorraine, Luxemburg, and the Saar. Five persons were killed and four wounded at Esch, in Luxemburg, and one killed and six wounded at Saarbrücken. No military damage was done, and the material damage was insignificant. Four aeroplanes were shot down by anti-aircraft fire or forced to descend.

The "Frankfurter Zeitung" reports under date Oct. 25th:—"Last evening enemy fliers flew over Mannheim. They were driven off by the defence fire without their making any attack."

* * *

The "Daily Express" correspondent, writing from Amsterdam on Oct. 24th, reports that the "Stuttgarten Neues Tageblatt" says:—"Our Admiralty declares that the Zeppelin raid on England has been particularly successful, as was proved by the fires and explosions that resulted. Our air heroes, whose bravery is unparalleled, attacked the principal English industrial establishments and destroyed vast quantities of war material.

"Unfortunately on this occasion our joy is mingled with sorrow. Four airships went astray over French territory, and failed to return. These are unavoidable accidents, however, which must be faced if we wish our splendid air weapon to do its part in razing to the ground the industrial districts of the leading English towns, and thus rendering it impossible for the Government to continue the war."

* * *

The following account from the "Lokalanzeiger" appeared in the morning papers of October 27th:—

France has long had upon her the guilt of the crime with which she tries to frighten us to-day. But for France the words "mene tekel" are written. Only a hundred kilométres before our front lies the fortress of Paris. Do the French really seriously believe it is their defence which keeps back our flyers from the heart of the French war power? Let France not deceive herself. We have means in our hands to ensure that for every house on which bombs are thrown by the French in peaceable German towns a whole street in the fortress of Paris shall sink into ruins. France must herself determine her own fate.

* * *

A message from Amsterdam says that Baron von Richthofen, the German aviator on long leave, married on October 21st Fraülein von Minkwitz, the millionaire heiress daughter of the Duke of Saxe-Coburg's Master of Horse. On the occasion of his marriage, the Kaiser appoints Richthofen his Equerry aviator, and it is probable that he will in future devote himself entirely to the training of fighting squadrons.

[It is not clear whether this refers to the elder or the younger brother. The elder is supposed to have been killed on active service.—Ed.]

RUSSIA.

Official Communiqués.

Oct. 24th.—On October 23rd, in the sector of Sereth village, two enemy battleplanes attacked by surprise one of our captive balloons, bombarding it with incendiary bullets. The balloon fell rapidly to earth and was entirely burnt. The observer, Sec. Lt. Polzoff, sprang out with a parachute and landed safely.

Oct. 29th.—On the Rumanian front, yesterday, at 12.35 p.m., the enemy; after an aerial engagement, brought down one of our machines, which fell in the village of Opritcheni (seven miles north of the village of Sereth). The aviators, Lt. Potukhoff and Lt. Kasatkin, were killed. On Oct. 27th, in the Dobrudja region, our hydro-aeroplanes dropped forty bombs on enemy detachments in the villages south-east of Tultchea.

ITALY.

Official Communiqués.

Oct. 23rd.—Weather conditions were favourable to aerial activity. Two enemy machines were brought down by one of our aviators; one, a German, fell within our lines near Gargaro (north of Monte Santo), and the other in front of our positions to the north of Podlaka (southern portion of Bainsizza Plateau).

Oct. 26th.—Ten enemy aeroplanes were brought down or forced to land by our aviators during yesterday.

An unofficial account says:—

Two Italian seaplanes, which were supported by three torpedo-boats, flew over Pola on October 23rd and attacked an enemy torpedo-boat.

Oct. 27th.—On Oct. 23rd Italian seaplanes carried out an important reconnaissance over Trieste, returning safely. Two seaplanes reconnoitred over Pola, beating off enemy aeroplanes and successfully attacking an enemy destroyer between Parenzo and Rovigno.

Oct. 28th.—An enemy aeroplane was brought down by ou artillery fire behind the enemy's front line.

* * *

It is reported that on October 19th a group of light enem units was sighted in the lower Adriatic. Italian aeroplanes an light warships were immediately sent to attack them, and th aeroplanes came into action, but it was not possible to come int contact with the enemy's warships, because they hastily returne to their base at Cattaro. At the same time Italian aviato attacked and put to flight an enemy submarine west of Avlona.

* * *

An Italian semi-official communiqué, published in Rome o Oct. 24th, says:—

The aviator who brought down the two enemy aviators, an nounced in the Italian communiqué of October 3rd, is Cap Baracca, who thus gained his 20th and 21st victories. The tw machines were hit by the unfailing machine-gun of the valiar officer within five minutes, and over the very limited spa which extends from Gargaro as far as the Podlaka zone.

One of these two machines, which was of German manufactu and operated by German aviators, was brought down in th Italian lines near Gargaro, and the pilot and machine-gunner we found dead. The other fell into the "No man's land" ne Ceferinsce, 10 to the north of Podlaka.

* * *

The United States has had a chance of seeing, and so, pr sumably, of believing in the Pomilio machines which have fo lowed the Capronis over the dyke. Since the Laureati trip gre things in duration and speed have been accomplished here. mentioned in The Aeroplane of Oct. 3rd, Sjt. Stoppani used Savoia-Verduzio for his fast Turin-Rome trip. I learn that th machine was built at the great Ansaldo works, and has a S motor. This is the fast machine predicted two months ago these columns.

* * *

On a similar machine to that on which Sjt. Stoppani did his fa trip to Rome from Turin, Major Lombard has just succeeded doing a cross-country flight of 1,400 kilometres in 6 hours a 45 minutes, without coming down, and over hilly country in d tinctly bad conditions as to weather. He left a Lombard lan ing place, and visited most of the better known cities, includi Ancona, Rimini, and Foggia during the flight, which or stopped at Bologna for a trivial motor trouble, and in view imminent fuel shortage.

* * *

The great Cattaro-cum-Caproni raid appears to be consider the finest affair yet carried through. It also suggests that se planes can be dispensed with in favour of the big pluri-motor machine for sea operations. All those taking part in the expe tion, which really may be said to have started from Milan when the squadrons flew to their official starting point stolidly und very adverse conditions, have been decorated. Major D'Annun was of the number.

* * *

The Austrian air attack on Italy's second port, Brindisi, w carried out by seaplanes, probably from 8 to 12 in number. Ea dropped two (?) very big bombs. The A.A. gunners, as usu at Brindisi, proved themselves absolutely effective in protecti the part of the city which it is essential to protect. Two, ce tainly, and probably three, of the raiders, were brought dow one of them being in serviceable condition.

* * *

Maj.-General Maggiorotti, the head of the Aeronautical Se vice on the Staff of the Commander-in-Chief, has been award a high honour with the motivation: "With firmness he direct the multiform energies of the Aero Corps—obtaining brillia results, and assuring to our forces the dominion of the skies."

* * *

The English Delegation to the Allied "Parliamentino" visit Taliedo on their way down to Rome.

* * *

S. Lt. Olivari, one of the trump cards in Italian aviation, h just been sacrificed to a banal incident, after having been th victor in so many well-fought fights.—T. S. Harvey.

HOLLAND.

A Reuter's message from the Hague states that a British aer plane fell in the sea near Westcappelle, in Dutch territori waters on Oct. 24th. Its four occupants, two officers and tw mechanics, have been brought to Flushing. The machine w reported to be sinking, but it was hoped to salve it.

A later report says the aviators have been interned.

DENMARK.

A message from Copenhagen states that a German seapla descended close to Bovbjerg, on the west coast of Jutland, o Oct. 22nd. The machine was completely destroyed, and one the crew was drowned.

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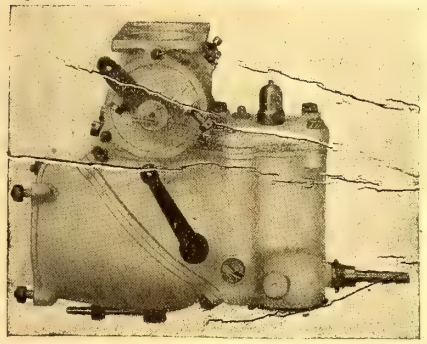
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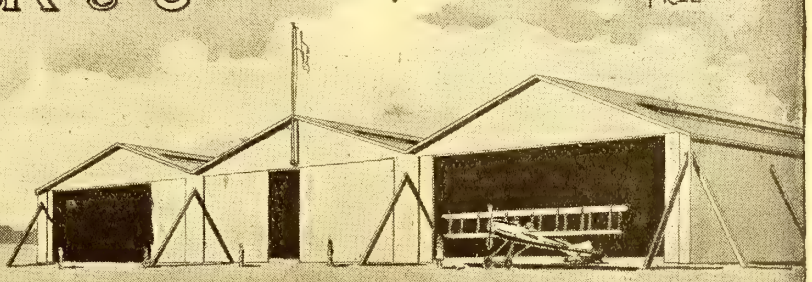
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MESOPOTAMIA.

The following extracts are taken from a report sent by Mr. Edmund Candler on Oct. 20th, which appeared in the "Daily Telegraph":—

To-day we successfully completed operations which have been in progress since the 16th against the Turkish position on Jebel Hamrin, a low line of hills which extend on both sides of the Diala.

By 7.20 a.m. our cavalry had got in rear of the position and were blocking the Khanikin road, but the Turks had slipped away in the night, crossed the Diala, and are reported by our aviators in retreat along the Kara Tobe road, having burnt Kizil Robat bridge behind them.

That the operations were a complete success, and the objectives secured with a minimum cost in casualties, is due in a large measure to the excellent work of our patrols, both on the ground and in the air. The ground over which we advanced offers every facility to a garrison on the hills defending the position from attack on the south. The same conditions of level approach to a honeycombed warren of mounds exist on the north side of the ridge.

Our aviators have been very active during the operations. On the 16th three of our aeroplanes bombed the enemy's aerodrome at Kifri, then, flying low, opened fire on the garrison with machine guns. The aviators apparently made very good shooting, and according to reports of deserters, the aim was most effective. Enemy aeroplanes have been little in evidence since.

One of our machines had to make a forced landing in hostile territory ten miles from Kifri. Another machine, a one-seater, descended and took the pilot off safely after burning the stranded aeroplane; while a third machine circled round and engaged Turkish irregulars on one side and kept down the fire of a hostile machine-gun on another.

This morning three of our aeroplanes dropped bombs on the enemy in retreat, scattering groups of infantry, horses, and transport wagons, and opened machine-gun fire on columns on the road.

AUSTRALIA.

In a dispatch dated Oct. 22nd, Mr. C. E. W. Bean, correspondent with the Australian Force, gives the following facts about the Australian Flying Corps:—

An Australian lad has already brought down a German. Another Australian is missing after a fight over German territory.

One Australian the other day was attacked by several Germans and brought down in No Man's Land. A British officer of a London regiment, seeing his machine fall, went out from the trenches alone with a view to attempting the rescue of the pilot. For the first part of the way he managed to keep under the cover of a slight rise, but the last part was quite open. Just before he reached the machine this brave man was hit, but went on and found the Australian lying in a shell-hole, wounded but alive. The British officer crawled back with this information.

Two non-commissioned officers were then sent out under a white flag, which the Germans respected. Stretcher-bearers followed, and the Australian was brought in. The British officer, fortunately, was only slightly wounded, and the Australian is recovering.

U.S.A.

A message from New York states that Capt. Resnati, flying in a Caproni aeroplane, created a world's record on Oct. 22nd, when he flew from Newport News to the Mineola military camp, a distance of 300 miles, in 4 hrs. 15 mins., while carrying eight men and flying at an altitude of 4,500 feet.

A Reuter message from Dayton, Ohio, dated Oct. 27th, says:—Lord Northcliffe to-day handed to Mr. Orville Wright the medal of the Royal Society of Arts awarded to him in recognition of his achievements in aeroplane invention.

STUNTING AGAIN.

A curious story was told at an inquest at Dover, on Oct. 25th, on George Hawks, whose back was broken while he was ploughing.

The coroner was informed that Hawks had stated that an aeroplane swooped down and frightened his horses, which bolted, and caused the plough to overturn on him.

Witnesses said that aeroplanes frequently swooped low while they were working. One man had to jump from a wagon to avoid being knocked off.

A verdict of "Accidental Death" was returned.

THANKS TO THE FLYING SERVICES.

On Oct. 29th, Lord Curzon, in moving a resolution of thanks to the Navy and Army for their work in the war, said of the Flying Services:—

I now come to the Air Service. Whether we are dealing with the R.F.C. or either of the Services, I deliberately say that nowhere in this country has the spirit of knight errantry been more conspicuously shown.

When in August, 1914, 100 officers and 66 machines made their way to France, who could have foreseen that they would have developed into a great fleet of thousands of machines and tens of thousands of men? [Lord Curzon might consult THE AEROPLANE of the period.—ED.]

On the Western front in the first nine months of 1917 the men of the R.F.C. brought down 876 enemy machines; they drove 759 out of action; 52 were brought down by anti-aircraft gunners; thousands of tons of explosive were dropped on aerodromes, bridges, railways, lines of communication, and even on marching regiments. Apart from offensive operations and activities of the Air Service they are the eyes of the Army in the field.

Then we must not forget the aviators at home, who have shattered the enemy's Zeppelins, and by their skill and bravery on many occasions have brought those great gas-bags in flames to the ground. I sometimes think when Gothas are shrieking over London, and when the civil population are cowering in their cellars, we might give a thought to those brave men who are riding in the darkness above and risking their lives to save us from destruction. [Who says civilians cower?—ED.]

I include in the same tribute the officers and men of the Naval Air Service. There is no distinction between the two Services. At the beginning of the war the personnel of the Naval Air Service was 800, and now it is 42,000. Its fleet in August, 1914, consisted of seven airships, 30 aeroplanes, and 34 seaplanes; whilst the number is now many thousands. The most effective branch of the Service has been the naval squadron at Dunkirk which has bombed aerodromes and has diminished and at times stopped the aerial invasion of our country.

These aviators have been in evidence in every theatre. They have flown over Damascus, dropped bombs on Beyrout, destroyed buildings in Constantinople, and their flight to the Lake of Constance in the early part of the war, and destruction of sheds there will be remembered.

[Much as Lord Curzon's tribute will be appreciated by those who fly, many will resent his curious statement that there is no distinction between the two Services. Also, it is curious that he should not have observed the correct order of precedence of the Services.—Ed.]

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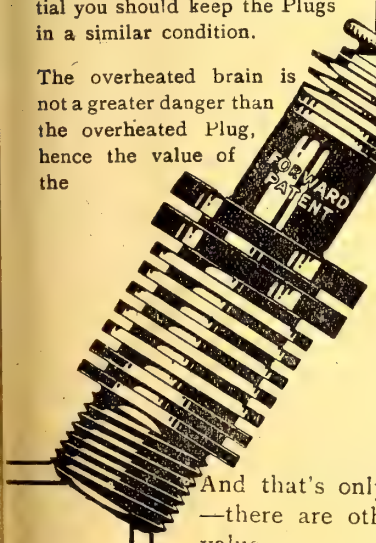
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Mr. Lloyd George, in moving a similar resolution of thanks in the House of Commons, said:—

But amongst all these I may be permitted to mention one arm of the Service which has appeared for the first time in this great war—I mean the Air Service. I am sure the House would like special mention to be made of our Air Service.(Cheers.) The heavens are their battlefields; they are the cavalry of the clouds. High above the squalor and the mud, so high in the firmament that they are not visible from earth, they fight out the eternal issues of right and wrong. They are struggling there by day, yea, and by night, in that titanic conflict between the great foes of light and of darkness. They fight the foe high up, and they fight him low down. They skim like armed swallows along the front, taking in their flights men armed with rifle and with machine-gun. They scatter infantry on the march, they destroy convoys, they scatter dismay. Every flight is a romance, every record is an epic. They are the knight errants of this war, without fear and without reproach. They recall the old legends of chivalry, not merely by the daring of individual exploits, but by the nobility of their spirit, and amongst the multitudes of heroes we must continuously thank the cavalry of the air. (Cheers.)

[All of which is very pretty, but does not increase one's respect for Mr. George as a practical man suited to lead a nation of practical men. There is no room for lyric poetry in this war. —Ed.]

THE R.N.A.S. COMFORTS FUND, 1917-1918.

Registered under the War Charities Act, 1916.

The Committee of the Royal Naval Air Service "Comforts" Fund, in view of the coming winter, most urgently appeal for funds and parcels containing any of the following articles:—Mufflers, helmets, mittens, jerseys, Cardigan (either dark blue or khaki) and socks (any colour).

All parcels should be marked R.N.A.S. Comforts Fund, and sent to Mrs. Henry Balfour, Langley Lodge, Headington Hill, Oxford, who will gratefully receive and acknowledge them.

Donations and cheques should be sent to Hon Treasurer, R.N.A.S. Comforts Fund, London City and Midland Bank, 129, New Bond Street, London.

The Fund has dispatched an enormous quantity of woollen comforts, in addition to gramophones, games, books, etc., during the last three years to the various fronts, and the Committee earnestly hope that the generous support given by all those interested in the R.N.A.S. Comforts Fund during the past three years will continue throughout the coming winter

The Committee consists of the following ladies:—Mrs. Henry Balfour, Mrs. Beuttler, Mrs. Delacombe, Mrs. Edmonds, Hon. Secretary; Mrs. Sueter, Chairman and Hon. Treasurer.

THE R.N.A.S. FUND'S AUDIT.

INCOME AND EXPENDITURE ACCOUNT. Sept. 30th, 1917.

Income.

	£	s.	d.
To Balance as at October 1st, 1916	48	17	3
Donations, contributions, and collections received from well-wishers of the Royal Naval Air Service.	2,851	3	1
	£2,900	0	4

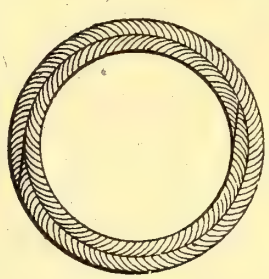
Expenditure.

	£	s.	d.
By Jerseys and sweaters	441	8	5
,, Gloves and mittens	39	2	6
,, Shirts	365	5	11
,, Cardigans and helmets	344	1	0
,, Handkerchiefs		15	0
,, Pants	196	14	9
,, Vests	314	15	2
,, Buttons, tapes, towels, meat lozenges, soap, sweets and stationery	16	17	10
,, Socks	131	10	1
,, Scarves and wraps	38	5	6
,, Boots	6	0	0
,, Gramophones and records	87	7	11
,, Cigarettes, pipes, etc.	40	17	2
,, Books, games, etc.	168	16	5
,, Flannelette, yarn and wool	37	5	3
,, Stamps and postages	3	13	2
,, Packing, rail expenses, etc.	24	12	0
,, Bank charges		6	7
,, Advertising	7	6	0
,, Sundries	5	8	8
,, Miscellaneous charges	3	8	0
,, Balance in hand September 30th, 1917	626	3	0
	£2,900	0	4

We have checked the above account with the books and vouchers and find the same to be correct.

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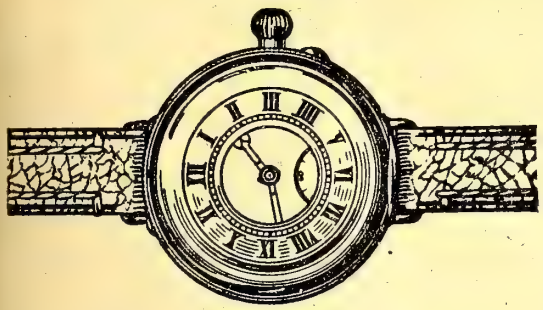
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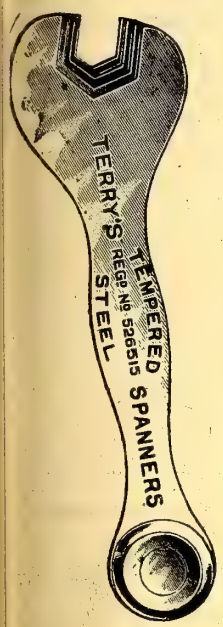
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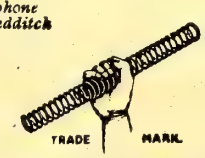
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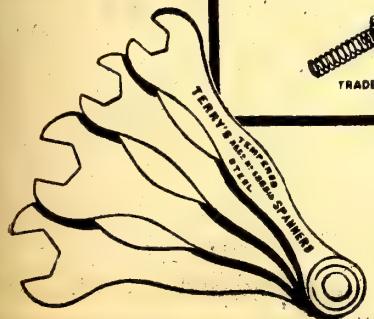
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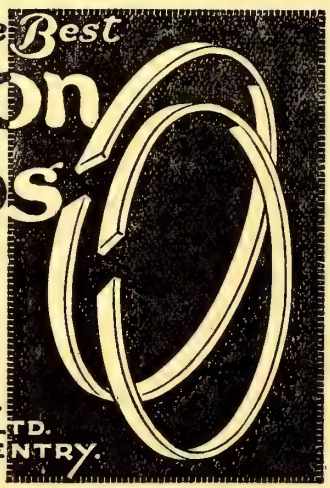
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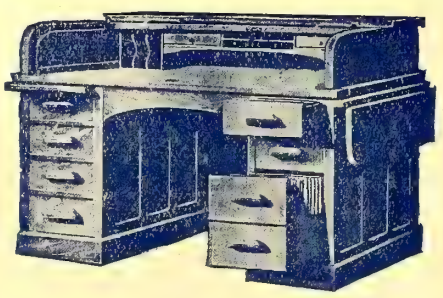
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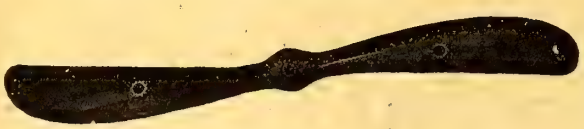
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ON SOME BOOKS AND THINGS.

Next week presumably it will be necessary to deal with political things once more, for one notices that Lord Montagu has promised the House of Lords a debate on the subject on Tuesday of this week, that is to say, the day before this paper appears, and consequently too late to be dealt with in this issue, and possibly the Air Ministry may have been announced by next week also, so that it looks as if for the next few weeks we shall again be plunged into the political arena. Not that anyone wants to argue politics—aeronautical politics, especially—but, after all, politics are history in the making, or unmaking sometimes, so when people insist on talking about them in Parliament one cannot ignore them in print. And, of course, the setting up of an Air Ministry is definitely an historical event, even if it be only set up to be upset.

All the same one wishes that politics and politicians would leave the Flying Services alone till after the War. Things are going very well indeed as they are, especially so far as the R.F.C. is concerned, and no change at present can possibly make them any better. The only possible benefit likely to arise from the combination of the two Services is that Army influence will probably predominate in the Imperial Air Service, and so the average efficiency will be improved.

Of course the Naval Branch of the Imperial Air Service will be under Admiralty control for purposes of administration, but that branch will probably be so small that it will not affect purely military and aerial operations, and it can be left to do its little best until such time as the senior officers of the Navy awake to the fact that seaplanes of various kinds are of importance to their assorted floating tanks. It took the Navy a long time to believe in iron ships, and water-tube boilers, and turbines, and submarines, in fact it is only just beginning to see the possibilities of submarines even now,—for which many thanks to Fritz. So we may hope to find flying machines taking their proper place in Naval operations, and flying officers taking their proper places as Naval officers and not mere air-marines, somewhere about in time for the next war, say about 1950.

Writers and Doers.

However, here we all are condemned to more political arguments, so let us, for our one week's reprieve, think about something more amusing, or, at any rate, more entertaining. Let us think about some books written by the men who have really done things. There are hundreds of thousands of men who do wonderful things —I am not quoting from "The Bing Boys"—and there are hundreds of those same men who try to write about them. But out of those hundreds there are not a dozen who can write of the things as they really happen.

The Flying Services have been particularly unfortunate in this respect. There have been books to burn—as the Americans say—about air war, and most of them ought to have been burnt before they were published.

Guilty, me lord! I once wrote one myself, but I plead in extenuation that it was only a little one and that it was only an attempt to tell in print tales which had been told to me by the men who were in the stories themselves or who had the stories on the spot from the chief actors.

There have been books on air war by people who have never been in the air at all, and books, which were worse still, by people who have been up in a balloon and call themselves air pilots in consequence. There have been one or two really readable books by real aviators, but only now has there arrived the genuine article, the book that gives us the Royal Flying Corps as it lives and has its being, in fact and in spirit, with all its faults sticking out life-size, and many of its virtues hidden under a proper veil of modesty.

AN AIRMAN'S OUTING.

I do not know who the officer may be who wrote "An Airman's Outings" and who signs himself "Contact," unless he happens to be one, of whom I only know by hearsay, who was invalided out of the R.N.A.S. and forthwith proceeded to distinguish himself in the R.F.C., but whoever he is he knows his job, both as a military aviator and as a writer. The fact that the book is published by Blackwood's is a guarantee that it is good stuff, but I doubt whether even the most experienced professional reader of that distinguished firm knew when he recommended it for publication how good the book really is to those who know the game of flying from the inside.

Judging from internal evidence I should guess that "Contact" is not a professional soldier, or that if he is his soldiering has begun since the War began, for his style lacks that slight stiffness of diction, due to long drilling on official documents beginning "I have the honour to state" and ending "I am, sir, your obedient servant," which gives to the professional soldier's writing just that unmistakable set which long drilling on the square gives to his shoulders. Also I should guess that he has not long been an aviator, for he is a trifle over fond of the word "airman," which in its common and erroneous connotation is an abomination for which the "Daily Mail" is responsible. The word is hardly ever used to express an aviator by pre-war fliers, though I regret to say it has become common in the Flying Corps, even amongst the most meticulously correct professional soldiers, who would scoff at anyone who called a rifle a gun. Strictly speaking an aviator stands in the same relation to an airman that a sailor does to a seaman, and aviation is to airmanship what sea-going is to seamanship.

General Brancker's Preface.

Curiously enough, Major-General Brancker, the most experienced of senior military aviators, in his introduction to the book, refers to "Contact" as a "fighting airman." The phrase has a horrible look of being journalese, but knowing from experience General Brancker's uncommon precision of thought and speech I am inclined to believe that he used the phrase deliberately to express concisely that "Contact" is an airman in the correct sense of the word, and is also a proved fighting man. In which case the epithet, which would probably be applied by the average journalist quite cheerfully to a 3rd Class Air Mechanic, becomes a very high compliment, for many first-class aerial scrappers are shocking bad airmen, while on the other hand some very capable airmen cannot induce themselves to cross the enemy's lines. The combination of a fighter and an airman in one individual is not so common as many might think.

General Brancker's introduction is typical of him. Concise and to the point, yet eminently thoughtful. He says:—"The Royal Flying Corps, from being an undependable and weakly assistant to the other arms, is now absolutely indispensable, and has attained a position of almost predominant importance. If the War goes on without decisive success being obtained by our armies on the earth, it seems almost inevitable that we must depend on offensive action in the air and from the air to bring us victory."—In which connection it might be worth while to refer back to an article in this paper some two and a half years ago on "Third Dimension Cavalry."

Referring to air raids, General Brancker says:—"We in London have had some slight personal experience of what a very weak and moderately prosecuted aerial offensive can accomplish. With the progress of the past three years before us, it needs little imagination to visualise the possibilities of such an offensive, even in one year's time; and as each succeeding year adds to the power of rival air fleets, the thought of war will become almost impossible.

"War has been the making of aviation; let us hope that aviation will be the destruction of war."

As I agree cordially with General von Bernhardi that war is a biological necessity I cannot echo General Brancker's hope. But one may hope that aviation will be the destruction of war of the present immobile and exhausting kind, so that the professional soldier, an adept in the exact science of strategy, may come again into his own in a war of movement. As a matter of fact I can scarcely believe that so keen a professional soldier as General Brancker, and so deep a thinker as he is, can have meant that hope to be taken literally. Though I have myself argued in print that the aeroplane of war may ultimately become the dove of peace, owing to the universal destruction caused by its means, yet I cannot bring myself to believe that war will ever cease so long as man retains the characteristics of a predatory animal.

In the preface to his book "Contact" expresses the hope that it will suggest a rough impression of work done by R.F.C. pilots and observers in France, and says:—"A complete impression they could not suggest, any more than the work of a Brigade-Major could be regarded as representative of that of the General Staff." Perhaps he is right. But nothing yet published gives anything like so complete an impression. One may suggest to him that a series of first-class photographs of an engine gives to the ordinary person a more understandable impression of that engine than would a mass of working drawings. He has supplied—so to speak—that series of photographs. The working drawings of the R.F.C. can only be obtained by those in the Corps itself. And I even venture to say that officers and men of the R.F.C. who have been in more distant war areas for a year or so will get from his book a better idea of the conditions of air war in France than they are likely to get in any other way, so that the book is by no means solely for the benefit of people like the charming lady in his preface who surmised that the R.F.C. lived mostly on cold food, and was mildly surprised that the aviators do come down for meals.

Early Days.

The first chapter of the book, which is devoted to describing the preparations of a squadron for departure to France, is one of the funniest and yet most illuminating things ever written about military aviation. Happily the equipment of active-service squadrons in waiting is improving every day, but the troubles of the pre-Somme period, as herein set forth, have doubtless their prototypes even now.

Nothing better has been done than the story of how Umpty Squadron got rid of its R.A.F. gun-mountings, called by the unregenerate pilots "the Christmas Tree, the Heath Robinson, the Jabberwock, the Ruddy Limit, and names unprintable"—according to "Contact"—and replaced them with the highly effective gun-rings of the ingenious Mr. Scarff, to whom, incidentally, congratulations on his well-deserved promotion. The ingenious method used in convincing a visiting High Authority of the futility of the Jabberwock simply has to be quoted:—

"In the first machine examined by the Big Bug, an exhausted observer was making frantic efforts to swivel an archaic framework from back to front. The Big Bug looked puzzled, but passed on without comment. As he approached the next machine a second observer tried desperately to move a similar monstrosity, round its hinges, while the pilot, stop-watch in hand, looked on with evident sorrow. The Big Bug now decided to investigate, and he demanded the reason for the stop-watch and the hard labour.

"'We've just timed this mounting, sir, to see how quickly it could be moved for firing at a Hun. I find it travels at the rate of 6.5 inches a minute.'

"'Disgraceful,' said the Big Bug. 'We'll get them replaced by the new type.' And get them replaced he did, the R.N.A.S. contract notwithstanding."

I will not spoil the story by relating the scandalous way in which pilots whose machines were cursed with Jabberwocks deliberately stole Scarffs to replace them. Read the yarn for yourselves, the small piece quoted only gives a faint idea of the gorgeousness of the jest.

But one's appreciation of it is a trifle marred by the thought of the labour and material wasted, and of the probable number of lives lost on active service, through standardising Jabberwocks. Still, after all, that is only part of the old, old story of relying upon official designers and producers instead of on the practical men who know how.

Marmaduke.

The landing of Marmaduke, the War Baby, in a fog and a field near "Dovestone," on his way to France is of necessity to be quoted as a sample of R.F.C. descriptive methods. Marmaduke had done in his undercarriage and airscrew fairly thoroughly, through mistaking for the aerodrome a field in which another machine had landed in error and because of *force majeur*. "He is distinctly young, but he can on occasion declaim impassioned language in a manner that would be creditable to the most liver-ridden major in the Indian Army. . . . Marmaduke danced around the unfortunate bus and cursed systematically person

and things so diverse as the thingumy fool whose machine had misled us into landing, the thingumy pond, the thingumy weather expert, who ought to have warned us of the thingumy Channel mist, the Kaiser, his aunt and his contemptible self. He was no what-you-may-call-it good as a pilot, shouted Marmaduke to the ruminative cow, and he intended to leave the blank R.F.C. for the Blanky Army Service Corps, or the blankety Gravediggers' Corps. As a last resort he would get a job as a double-bank Cabinet Minister, being no blank-blank good for anything else."

Which, I can swear, is true to life. Especially the R.F.C.'s opinion of Cabinet Ministers. I regret to have to confirm also that the use of the word "bus" by "Contact" is true to life. Despite the documentary reprobation of the word by a philorthological General in France, the unredeemed souls of the R.F.C. still call their machines 'busses and 'planes, as frequent alternatives to the more correct, if more cumbersome, aeroplanes or flying machines.

However Marmaduke's effort was, it seems, appreciated by a brass-hatted spectator, "a young-looking major, with pink riding breeches and a prairie accent," who said to his fellow Brass Hats,—"Gentlemen, some beautiful birds, some beautiful swear, and, by Abraham's trousers, some beautiful angel boy.' Marmaduke wiped the foam from his mouth and apologised."

The subsequent adventures of "Contact" and Marmaduke, how they were arrested as German raiders by the "Bing Boys"—or local special constables, how they were hailed by "Dovestone" as the conquerors of the non-existent raiders, and what Marmaduke did for the autograph fiend, and what the newsboy said about Marmaduke's hat,— are they not written in the first chapter of the book of "Contact"? That hat, "shapeless as a Hausfrau, ponderous as a Bishop, unstable as a politician, grotesque as a Birthday Honours' List," making Marmaduke "look like Lord Haldane at the age of sixteen," deserves to be illustrated, if only some great genius would do it. Yet I know I have seen that hat. I should like to meet Marmaduke, though I know quite a lot of his twin brothers.

The Big Push.

The worst of reviewing "Contact" is that one wants to quote him page by page, which, apart from laws of copyright, would occupy several issues of The Aeroplane, for I know I should start swopping yarns with him, and that would make the review about twice the size of the original book. So I will be as brief as I can.

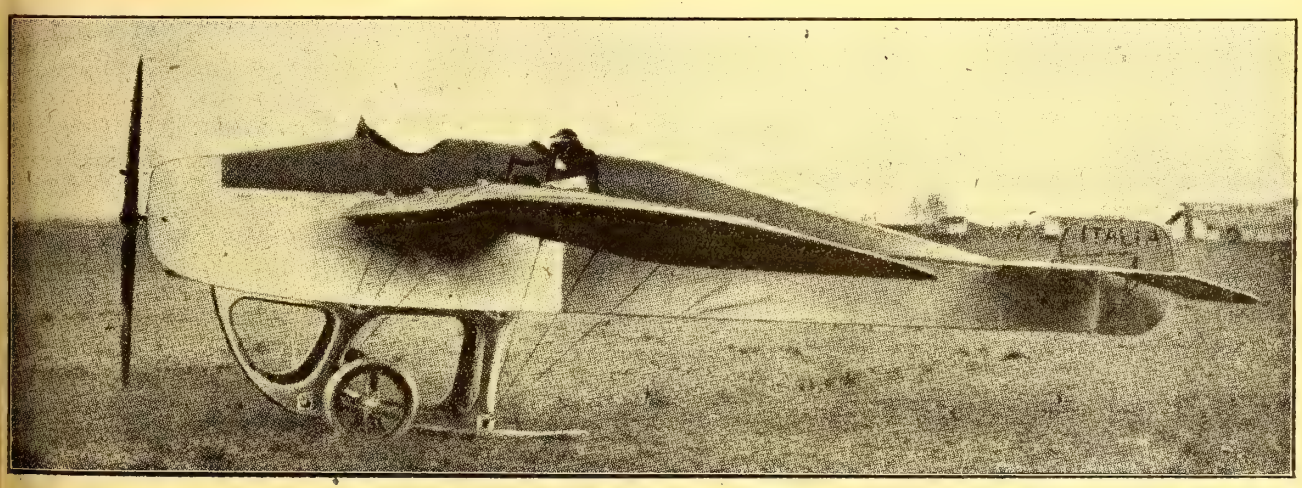
Apropos. Some time ago I went to see a wounded friend, an R.F.C. officer shot through the lung, and found him apparently spasmodically breathing his last. Investigations showed that the cause of the paroxysm was a letter beginning, "I am told that you are now permitted to receive letters, provided they are brief. I am being as brief as I know how." After which followed twelve closely written sheets of notepaper, the last one bearing the signature of Mr. George Bernard Shaw. I wonder whether Mr. Shaw ever knew how near that letter came to killing one of his best interpreters. Anyhow, I, like Mr. Shaw, will be as brief as I know how.

So far I have merely quoted "Contact" the humorist. The serious "Contact" is no less fascinating and illuminating. The story of the Somme Push, the rumours of the Tanks, the preparations for the big aerial operations, the atmosphere of the Mess the night before that attack, the attack itself, the starting of the squadron in the dawn—"a light grey with pink smudges from the forefinger of sunrise"—the battlefield from above, the dodging of Archie, the first meeting with the Hun's chasers, the bringing down of their first Hun machine, the subsequent series of scraps, the deaths of the gallant "C."—the patrol leader—and of "Uncle" and "Paddy"—two very brave gentlemen who died actually at the butts of their machine-guns—are told as such things have never been told before. And they are all crammed into one chapter under the simple title of "The Day's Work," for such in truth they are. But after reading that chapter one feels that one is at last in touch with the soul of the R.F.C.

The mental impression is as clear as that conveyed by those wonderful photographs of enemy positions taken by the R.F.C. photography machines and shown under vows of secrecy to the privileged few outside official circles. Yet one gets a wider view, and a far greater inside into the workings of the Corps, than any picture or deliberately composed description could ever give. "Contact" wrote that chapter because his "insides" forced him to it. He could not have written it to order.

Offensive Patrols.

Follows thereafter "A Summer Joy-Ride," the story of an offensive patrol, out for the sole purpose of strafing the air-Hun over his own lairs, irrespective of the Army's tactical operations below. How the patrol was nearly lured to destruction by three German biplanes skilfully used as ground-bait for Archie should be a useful object-lesson for young aviators, and the description which follows of a fire in the air, in the middle of a hot fight with a Hun, should be an equally useful warning. The anti-climax of the proceedings after the lucky landing in the French lines is almost as great a relief to the



AN INTERESTING RELIC.—A SIA Monoplane of 1913. The general "eyeableness" of the machine is notable, as is the careful streamlining of the whole affair, which reflects great credit on the early Italian designers.

reader as the function must have been to the actual participators therein. They deserved their supper in Amiens with a French officer, "three charming ladies and the widow Clicquot."

Long Reconnaissance.

Again we get "Contact's" curious photographic effect in his chapter on "Spying Out The Land," a story of a long reconnaissance, with an engine which went on strike fifty miles behind the enemy's lines. The first part is wonderfully pure descriptive work, but the second part is finer writing, with its atmosphere of doom as the lame machine struggles home dogged by a German chaser, and thrills one much as one used to be thrilled in one's youth by a story of wolves dogging a sleigh in Russia—when Russia was a country worth writing about—or by a story of a shark dogging a boatful of shipwrecked sailors.

The description of "the family ghost," one of Archibald's numerous experiments in frightfulness, is better than any I have heard verbally, though the mystery is still unexplained. I hope that after the War some good-natured Hun who has been an Archie gunner will be so kind as to explain precisely what the Germans hoped to achieve with "the family ghost," the "flaming onions" and one or two other forms of nastiness which our dull insular brains have so far failed to understand.

On one point "Contact" deserves severe condemnation. As an officer and gentleman he had no right to add to the horrors of war by singing to his unfortunate pilot down the speaking-tube, merely because they had managed to reach our own lines and there was nothing more to fear from the enemy. Still, that long reconnaissance was a good effort.

The Rest.

It is impossible to go on reviewing "An Airman's Outings" in detail; it must be read to get even a faint idea of its many joys. The chapter on "There and Back" on leave displays another side of "Contact's" genius, and the last sentence of that chapter is a straight shock. "Ends and Odds" shows yet another side, that of the historian and the short-range prophet, and it is of peculiar interest to me personally to see how closely his view, corrected by the perspective of events seen from 1917, agrees with contemporary history as set forth week by week in this paper.

Since writing the foregoing sections of these notes a friend has told me that "Contact" was once on the staff of the "Daily Chronicle." If that be so I fear his career as a Liberal or Radical journalist is blasted by this book, for he refers to the beginning of the war as a period "when the Haldane-Asquith brotherhood were caught napping," and he shows reckless contempt for Cabinet Ministers, politicians, and Government establishments, such as the old-time R.A.F., which are far from being calculated to endear him to the "Chronicle" crowd. One hopes, therefore, that he may decide to become a professional soldier, a job to which he seems distinctly fitted.

Heretical Views.

"Contact" seems to have, also, ideas which do not march with those of certain high authorities. For example, he is a believer in bombing on a big scale, despite the recent dictum, hitherto I believe unpublished, of our leading military politician to the effect that the Army does not need, and never will need, big bombing machines. This dictum may be true in its limited sense that big bombers are not wanted for tactical operations in direct connection with the Army on the ground,—though the point is arguable, especially in the light of certain very recent German operations. But in a wider sense, that is as a means of decreasing the pressure on the firing line by the proper strategical use of aircraft, the big bombing machine is the only thing that counts. I trust that the new Air Minister, whoever he may be, will take due note of the fact.

"Contact" is also a believer in the use of specially designed machines for "cavalry" work over enemy trenches, a reversion to our old Hun friend "Copperbelly" of the Ypres Salient in 1915, which, it is rumoured, is being revived by the Germans to-day. It may perhaps be taken seriously by us in a year or so, after the P.B.I. have produced enough evidence in the shape of casualties from their trenches to prove that it is a type worth developing.

The fact that such heretical views as these were allowed to pass by the Censor who vetted "Contact's" book show that they were regarded with contempt by the High Authorities. But as the successes of to-morrow have been generally regarded with contempt by the Authorities of yesterday, the advocates of the big bomber and of the special ground-operations machine may feel greatly encouraged by the official attitude.

An Enlightening Sentence.

Apropos High Authorities, writing of his own squadron (on p. 215), "Contact" says "the machines were the best British two-seaters then in existence, and their work throughout the autumn push was to be more dangerous than that of any squadron along the British front" . . . "And the reward? One day, in a letter written by a captured Boche airman, was found the sentence: 'The most to be feared of British machines is the S——.' The Umptieth squadron then had the only machines of this type in France."

Now the points about those sentences are that

(a) Internal evidence elsewhere in the book clearly shows the machines to have been Sopwith "one-and-a-half strutters."

(b) The Somme fighting took place in September 1916.

(c) The Sopwith one-and-a-half strutter was produced in June, 1915, and broke the British Height Record shortly afterwards.

(d) The first of the type with the new Clergêt engine was bought by the French on December 20th, 1915.

(e) Lieut.-General Sir David Henderson, then Director General of Military Aeronautics, when the facts mentioned in (c) and (d) were stated before the Air Enquiry Committee in July, 1916, endeavoured to convince that Committee that the supply of one-and-a-half strutters had been properly handled by him and his department.

(f) And here we find that in September, 1916, despite all Sir David Henderson's protestations, *one solitary squadron* was equipped with these machines, though it is perfectly obvious that under efficient direction the Department of Military Aeronautics could have had them in quantities by March or April of 1916.

A Proper Outlook.

One passage much to be commended is a contrast between the life of an infantry officer and of an R.F.C. officer "by way of prelude to a protest against the exaggerative ecstasies indulged in by civilians when discussing the Air Services." His contempt for the people in Parliament who talk of "the super-heroes of the war" is immense, though he refrains from the obvious remark that if they would talk less tosh about heroes, and do more to see that the needs of the Flying Services are properly met they would do more to justify their unlovely existences.

The articles composing the book were published originally in "Blackwood's Magazine," and to them is appended a section entitled "Letters from the Somme" revised for publication by "her" special permission

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They are written, naturally, in a more personal style than the rest of the book, but they are just as cheery, just as wise, and just as informative. The recipient of the letters is to be congratulated on her good fortune.

One gathers that "Contact," who was an observer when he wrote the articles, is now a pilot "of average ability." It is to be hoped that his ability and luck together have kept him alive up to the present and will so keep him for many years to come. He promises another series of articles, if so spared. For that reason alone it is well that Fate should be kind to him, if Fate has any decent sense of her duty to literature.

BALLADS OF THE FLYING CORPS.

In a very different category is "Ballads of the Flying Corps," by G. R. Samways, R.F.C., an N.C.O. of ability, with a keen sense of observation and an equally keen sense of the ridiculous. The fourteen sets of verses which compose the book are as much the real thing as are "Contact's" articles, only from an entirely different point of view. Much of that point of view is that of the R.F.C. man on the ground. The spirit of the whole thing is reflected very well in the second verse of the first ballad, which runs:

"When you shave in icy water, and no beaming bright-eyed daughter
Brings your "brekker" on a dapper little tray,
When you're faced with plum-and-apple, just before you have to grapple
With the thousand pressing problems of the day;
When the road seems long and dreary, and you're sick and stale and weary,
And you're sighing for the things that are sublime,
Don't go flying in a paddy, but be up and doing, laddie,
And you'll find you're on the target every time!"

Excellent advice that to the fed-up Air Mechanic, whether at home or abroad, and equally good advice to the fed-up officer for that matter.

Really funny is a ballad "To a War Bride Who has Assisted in the Construction of Aeroplanes."

Its ungallant sentiments will certainly call down on Mr. Samways' head the wrath of all the fair ladies who fry perfectly good sheet steel into the similitude of grilled kippers by means of an acetylene flame.

There is much good stuff in the book, and it gives one an insight into a side of the R.F.C. which is little known even to those who know much of aviation, and, of course, a side which is quite ignored by the Press as a whole.

SONGS OF THE SUBMARINE.

There is so much affinity and at the same time so much antagonism between aircraft and submarines that everyone interested in aeronautics, and the R.N.A.S. in particular, ought to read "Songs of the Submarine" by one signing himself "Klaxon." Why "Klaxon" he alone knoweth, for his songs are far from resembling the blatant bray of that instrument of torture. In fact the dedication of the book "To D.V.B." is one of the most charming and yet one of the manliest things in all poetry. Here it is:—

"They watch us leaving harbour for the greatest game of all,
And wonder if we're coming back across the greedy sea;
They never know the fighting thrill or high adventure's call—
I rather think the women-folk are better men than we.
But I suspect they say of us, as out to sea we go,
In all our panoply of pride from Orkney to the Nore:
"'It keeps them quiet, we suppose—they like the work, we know—
And soon perhaps they'll tire and play some safer game than war.'"

The lady to whom that dedication is addressed has every right to be proud of the man who wrote it.

The first poem, "The Sailor's View," is at once a welcome to America and a testimony to the first submarine to be used in war, and it is to be hoped that the American Navy appreciates the fine spirit in which it is written.

"Wet Ships," the second poem, is a magnificent challenge to the German Navy and to North Sea weather alike. It speaks from the heart the spirit of the Submarine Service, a service which, like the Flying Services, depends on the spirit of the individual so much more than does a service in which men co-operate in masses.

By way of comic relief comes an Ode to the Maidstone's Cat, an effort in mock-heroics worthy of all praise. A naval friend describes it as "the finest thing in poems since Homer's first edition ran out of print." The shade of Homer will appreciate the compliment.

The religion of the Submarine Service is shown in "1797," an example of the old Navy's way, best demonstrated by quotation:—

"We pray as the Flag-Lieutenant prayed
At St. Vincent's cabin door.
(Twenty sail of the line in view,
South-west by south they bore):
"'Oh, Lord of Hosts, I praise Thee now,
And bow before Thy might,
Who hath given us fingers and hands to fight
And twenty ships of the line in sight;
Thou knowest, Oh Lord, and placed them right,
To leeward, on the bow.'"

Our kinship with "Our gentle pirate ancestors from off the Frisian Isles" is admirably demonstrated in "Low Visibility":

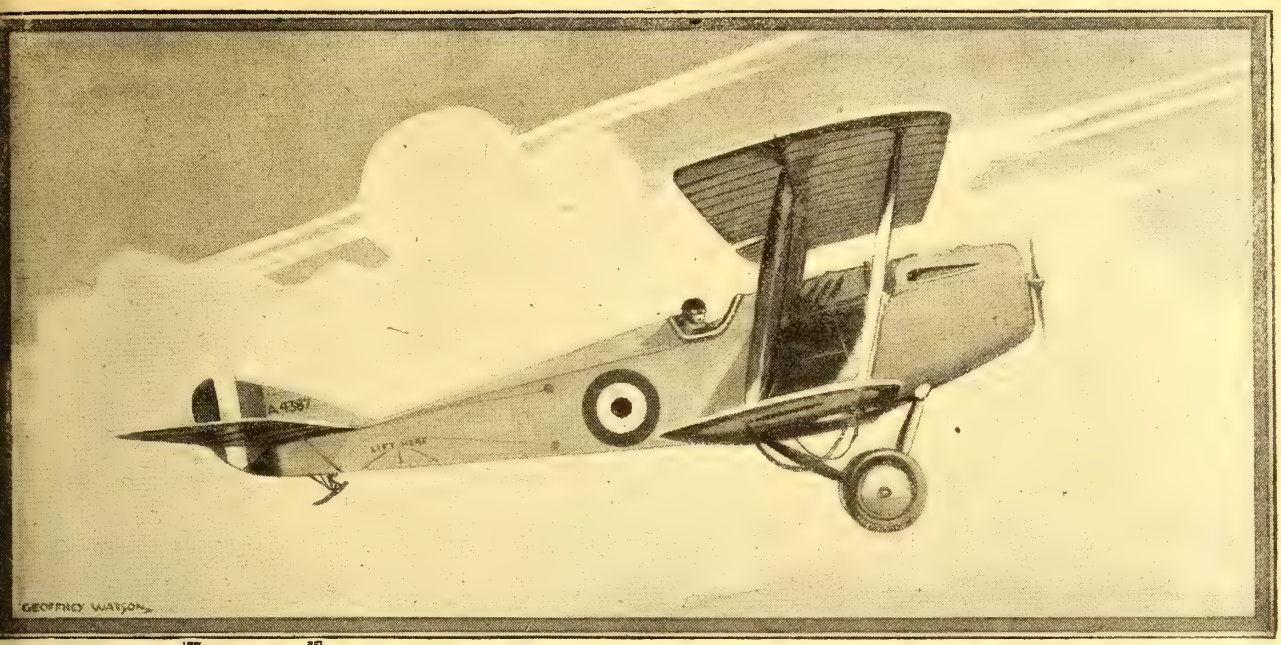
"For as the misty clouds came down and settled wet and cold,
The sodden halliards creaked and strained as to the swell they rolled,
Each yellow-bearded pirate knew beyond the veil of white,
The prize of all the prizes must be passing out of sight."

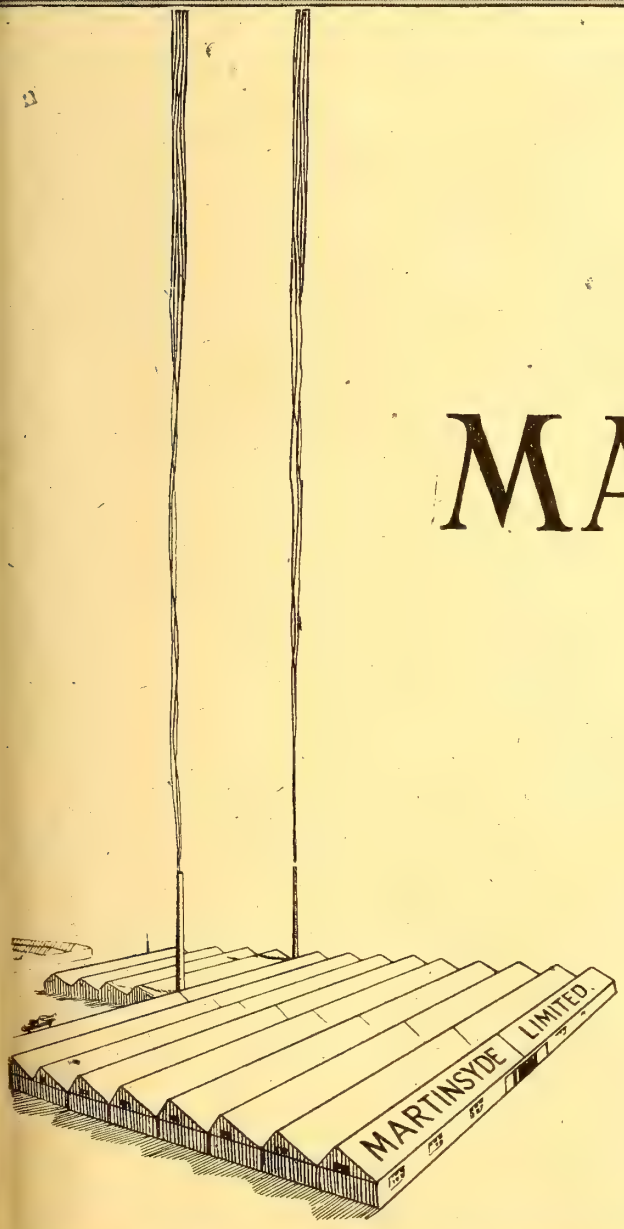
"Hang On," "To Fritz," "Overdue," all give one a priceless insight into the outlook on life—and death—of a submarine officer, and none will appreciate that insight more than will those who fly. And quite apart from submarine work, all will admire the stirring poem "To the Scottish Regiments," a wonderful piece of work which blends curiously the style of Kipling at his best with the spirit of the Highlands.

"Klaxon" is decidedly a poet to be cultivated, and it is to be hoped that he will be granted further inspiration to produce more and more such work. The profits from the book will go to the Union Jack Extension Fund, which should be increased considerably thereby if the literary taste of the educated portion of the British public is as good as I believe it to be.

Anyhow I can promise all my readers, whether mere spectators of the great game of war, or up to their necks in it, that they will be entertained, informed and amused by these three books.—C. G. G.

[NOTE.—"An Airman's Outings" is published by Blackwood's (post free, 5s. 3d.). "Ballads of the Flying Corps" (2s. 9d. post free) and "Songs of the Submarines" (2s. 3d. post free) are published by McBride Nast & Co. All may be obtained from the William Dawson Publishing Co., Ltd., 2, Breams Buildings, E.C.]





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THE AERONAUTICAL HISTORY EXHIBITION.

The Aeronautical History Exhibition organised by Lady Drogheda, which has toured the principal cities of England and Scotland, and is now on view for the last time at the People's Palace, Mile End Road, was opened on November 1st by Lord Cowdray, President of the Air Board.

The Mayor of Stepney, in the chair, referred to the fact that all the school children of London would be given an opportunity of visiting the exhibition, and drew attention to the ubiquity of the Air Services, as illustrated in the wonderful photographs.

Lord Cowdray said that the task of the Air Board was no small one. There were hundreds upon hundreds of thousands of men and women engaged in the manufacture of aircraft. On these men and women depended the future of England. The machines which they were now producing could rise to a height at which breathing was difficult for most people, impossible for some, and at which relief could be obtained only by the use of oxygen. They had a greater speed than double that of the quickest express train. They were being manufactured at a great and ever increasing rate.

Wednesday night had been an anxious one to many of the residents of Greater London, but we had to realise at the same time that the momentary inconvenience and strain which these raids involved were nothing compared with the demands being made upon the Navy, Army, and Air Service. These raids had only one object. The enemy hoped that they would have the object of bringing about peace. He had yet to know the Englishman who was afraid of warfare of this kind, and he was sure the country was with the Government in being determined that the Germans would have to pay in numbers, in deaths, and in money eventually for all the damage and injury they were doing just now.

Major-General E. B. Ashmore, C.B., M.V.O., commanding the air defences of the London area, said that London for the purposes of the air was as much on the battle-front as any town on the Continent. The Germans came here as often and in as great strength as they could. The effect of the arrangements made by Lord French was that of the German aircraft which came over nine-tenths failed to reach their objective.

We could not make absolutely certain yet that no German machine would reach a great place like London. If we had all the machines, guns and lights in the world, we could not prevent this—at present. But we had stopped for the time, at any rate, attacks by day, and attacks by day were far more dangerous than attacks by night. When they came by night, only about one in ten got through the defences.

In one Zeppelin raid on Friday week there were ten Zeppelins, each capable of carrying about two tons of bombs.

On Wednesday night the Germans made seven separate attacks. Of these seven attacks six were stopped by our barrage and other arrangements. In the seventh attack, two, or at most three, machines got through. But the effect of these raids was extremely small, owing to the defences, compared with the efforts which the Germans put forth. It was impossible to stop them altogether. A town near the coast in France has been bombed on 50 nights out of the last 60.

They were doing their best day and night to defeat the Huns who came over, "and," said he, "I do not think it would be altogether politic to hang us whenever a bomb is dropped in London. It would be expensive from the point of view of personnel, and I am not sure that you would be much better off when you had hung us all." The anti-aircraft men were very keen, very well trained, and very capable. We had also very good machines flown by pilots second to none in the world.

He had under him pilots who will take up fast machines, machines that can go high, and therefore must fly fast, and also land fast. They take up these machines not only on moonlight nights, but on black nights.

Mr. Joynson-Hicks said he did not think England realised how much we owed to Lord Cowdray's work at the Air Board. Before very long the powers of the Board would be enlarged and extended.

The first hours of the exhibition were enlivened by the strains of the Pulham Band, which performed admirably, if so strenuously as to give the impression that each artist trained for his performance by blowing up by sheer lung power the ballonets of our biggest airships.

The exhibition, which should be visited by everyone interested in aeronautics, is for the benefit of the Flying Services hospitals. A characteristic notice by Lady Drogheda runs as follows:—"If you think that this exhibition—and its object—are worth more to you than the entrance money paid, you can even things by putting an extra donation into this nice box."

Manufacturing firms are invited to contribute. Cheques should be made payable to the Flying Corps Hospital Fund, and addressed to the Countess of Drogheda, 40, Wilton Crescent, S.W.

The show is open from 10 a.m. to 10 p.m., and the prices of admission, from 10 a.m. to 4 p.m. is 1s.; from 4 p.m. to 10 p.m., 6d.; children, 3d. The nearest Underground station are Stepney Green and Mile End.

THE AERONAUTICAL SOCIETY OF GREAT BRITAIN.

Following is the syllabus of the Society's activities for 1917-18.

Subject, "The Technical History of the Aeroplane." Lecturer, Major Green; Chairman, Major Baird, D.S.O., M.P., Parliamentary Secretary to the Air Board.

Date, Wednesday, Nov. 21st, at the Institute of Civil Engineers, at 8.0 p.m.

Subject, "The Wind Tunnel." Lecturer, Mr. J. R. Pannell; Chairman, Sir R. T. Glazebrook.

Date, Wednesday, Nov. 14th, at the Institute of Civil En-

Subject, "Meteorology in Relation to Aviation." Lecturer, Dr. W. H. Dines, F.R.S.; Chairman, Sir Napier Shaw.

Date, Wednesday, Dec. 5th, at the Society of Arts, at 8.0 p.m.

For the Young.

On Wednesday, Jan. 2nd, Lieut. A. P. Thurston, D.Sc., will give a Christmas Juvenile Lecture on "The Aeroplane," illustrated with models and cinematograph. Col. O'Gorman, C.B., in the chair. Applications for tickets should be made to the Secretary, 7, Albemarle Street, W.1.

New Year Lectures.

The lectures after Christmas will include:—

"Design of Aeronautical Instruments," by Major Filon (Head of Instrument Department at the Air Board).

"The Standardisation of Small Aeroplane Parts," by Messrs. Isaac and Mansfield.

"Long Distance Flying," by Major Green.

"Screws and Threads," by Capt. Bishop.

Educational Lectures.

At the request of the Air Board the Society have arranged, on the same plan as the highly-successful education lectures at Hendon last year, courses of educational lectures at the R.A.F. (South Farnborough), Birmingham, Coventry, Southampton, Bristol, Peterborough, Lincoln, Hammersmith, Norwich, and Leeds. The lectures begin at South Farnborough on Nov. 15th, and the first five courses are given below:—

Lecture.	Lecturers.	Farnborough.	Southampton.	Hammersmith.	Bristol.	Birmingham.
History and Development of the Aeroplane	Major Green	Nov. 15	Nov. 16	Nov. 19	Nov. 20	Nov. 21
The Aerofoil	Mr. Relf	,, 22	,, 23	,, 26	,, 27	,, 28
The Airscrew	Mr. Fage	,, 29	,, 30	Dec. 3	Dec. 4	Dec. 5
The Modern Aeroplane	Capt. Barnwell	Dec. 6	Dec. 7	,, 10	,, 11	,, 12
Materials and Methods of Design	Mr. Boswall	,, 13	,, 14	,, 17	,, 18	,, 19
History and Development of Airships	Lieut. Turner	,, 20	,, 21	,, 31	Jan. 8	Jan. 2
Materials and Constructions of Airships	—	,, 27	,, 28	Jan. 7	,, 15	,, 9
Stability and Control	Capt. Aston	Jan. 3	Jan. 4	,, 14	,, 22	,, 16
Aero Engines	Lieut. Irving	,, 10	,, 11	,, 21	,, 29	,, 23
Meteorology & Navigation	Prof Duffield	,, 17	,, 18	,, 28	Feb. 5	,, 30

Time, 8 p.m.

Applications for tickets should be made to:—

The Superintendent, Royal Aircraft Factory.

Mr. A. E. Astington, Austin Motor Works, Birmingham.

Dr. Hill, University College, Southampton.

A. V. Roe and Co., Ltd., Southampton.

Gwynnes, Ltd., Chiswick.

Mr. H. T. Cooper, The British Tramways and Carriage Co. Ltd., Clare Street, Bristol; or at the offices of the Society, 7 Albemarle Street, London, W.1.

At the Council Meeting on Oct. 23rd, the following were elected to membership of the Society in the respective grades:—

Associate Fellows: W. E. Dommett, C. R. Taylor, M. Taylor, C. C. Turner, Miss E. M. L. Keary, Capt. N. C. Sprat

Members: P. J. Camm, F. Fairbrother, E. Sparshott.

Associate Members: C. F. Campbell, P. Gidney, C. P. Strid G. W. Pickett, J. B. Butler, G. Budden, Mrs. Macalister.

Students: J. Kanyon, S. Humphries, B. W. O. Townshend.

A Notable Election.

Miss Eily Marguerite L. Keary, of the National Physic Laboratory, has been elected an Associate Fellow of the Aer nautical Society. This is an interesting occasion, as it is t first time a lady has been elected to so high a qualification the Society's membership.

Miss Keary took Honours in the Mechanical Science Tripos Cambridge, and has done a good deal of experimental a research work in aeronautics, both at Cambridge and Teddingto

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ANOTHER DECORATION.

"L'Echo de France," a French journal published in Salonika, and edited by French newspaper correspondents in that area, chronicles in its issue of Oct. 25th the award of the Gold Medal of the Aero Club of France to Sous-Lieut.-Aviateur Louis Noel.



The Sous-Lieutenant Aviateur Louis Noël.

In announcing the award, "L'Echo de France" says:—"Sous-Lieutenant Noel, who enlisted voluntarily, has distinguished himself on many occasions by his wonderful exploits. One recalls, for example, the flight which he completed last year from Salonika to Bucharest and back. He has also carried out bombardments on the Royal Palace at Sofia.

"He holds the Croix de Guerre with five citations, the Médaille Militaire, and the Légion d'Honneur, without counting various Serbian, Roumanian and Russian orders.

"The very high distinction of which he has just become the object will be unanimously applauded in the Army of the Orient, where everyone recognises him as an 'ace' without rival, and where he counts nothing but affectionate and admiring sympathies."

As a matter of fact, our old friend, Louis Noel, now possesses, in addition to the Croix de Guerre, the Médaille Militaire, the Legion of Honour, and the Gold Medal of the Aero Club of his own country, the British Military Cross, the Serbian White Eagle, and the Russian Order of St. George. Needless to say, all his old friends in this country will heartily welcome this latest honour which has been conferred upon him, not by Government officials, but by the vote of his own compeers among the pioneers of French aviation.

THE WORK OF THE R.N.A.S.

On Nov. 1st, the First Lord of the Admiralty, Sir Eric Geddes, speaking on the Second Reading of the Consolidated Fund Bill, reviewed at some length the work of the Royal Navy. Apropos the Royal Naval Air Service, he said:—

"The personnel of the Fleet before the outbreak of war was 146,000; to-day it is 390,000. In this is included the Royal Naval Air Service, which has alone increased from 700 to 41,000. The duties of the Royal Naval Air Service are varied, of great value, and of absorbing interest. Its great efficiency and gallantry in France are occasionally brought to public notice by reports of bombing expeditions and otherwise.

"But any statement on the Navy would be incomplete without a tribute to the Royal Naval Air Service in operations over the sea. They are the terror of the submarine. During one month the aircraft patrol round the British coast alone is more than five times the circumference of the earth.

"I think it may interest the House and instruct the public if I give some indication of what the Royal Naval Air Service alone has done in bombing behind the enemy lines in France. During September alone 64 raids were carried out on dockyards, naval depôts, enemy aerodromes, and other objects of naval and military importance in Flanders behind the enemy lines. No fewer than 2,736 bombs were dropped by the Royal Naval Air Service alone, totalling 85 tons of explosives.

"The figures for October are not yet completely tabulated, but are still greater. There is no doubt that these raids result in great material and moral damage, and on many occasions their effect is shown in the aerial photographs to be such as to hamper and restrict seriously the enemy naval, aerial, and military undertakings."

CONGRATULATIONS.

HUBERT—EWART.—On Nov. 3rd, at the Church of the Most Holy Trinity, Brook Green, Adjudant-Pilote Charles Hubert, Croix de Guerre, son of Dr. and Mme. Hubert, of Cherbourg, France, was married to Bettie Xenie, daughter of the late Dr. Charles Ewart, of 58, Queen's Gate Terrace, S.W., and Mrs. Ewart, of 24, Argyll Mansions, Addison Bridge.

Charles Hubert will be remembered by all the old-timers in aviation as one of the Anglo-French pioneers who did so much to help progress in the early days of flying in this country. He was one of the first of the Hendon pilots, and did splendid work as an instructor and demonstrator. He had a very bad smash in the "Aerial Post" Hendon-Windsor performance in September, 1911, and broke both his thighs in trying to take a heavily overloaded biplane off the ground with mail bags on board. Despite his grave injuries, he made a wonderful recovery, both of health and nerve. On recovering, he returned to France, and worked with the Astra Co. on seaplanes.

At the outbreak of war he joined the Service d'Aviation Militaire, and was appointed to the famous Escadrille M.F.88, where he did splendid service which won him a well-deserved Croix de Guerre. He was wounded some time ago, and this fact, coupled with the effects of his old smash, kept him for some time employed at an instructional aerodrome. He has recently been flying at the front again. All his old and new friends will wish him and his charming bride every good fortune and happiness.

AN AMERICAN FLYING-BOAT CLUB.

It will be news to many readers of The Aeroplane to learn that there exists in New York a Flying Boat Club run very much on the lines of a marine yachting club, with its due complement of commodores and other nautical officers.

The movement was started in 1916 when the Harlem Board of Commerce and the Harlem Luncheon Association, two active institutions in New York, took an interest in the matter, and acquired a site on the Hudson River at Riverside Drive and 129th Street, which was handed over without charge by the City Park and Water Commissioners.

This site will be used as the club grounds, and on it will be erected the clubhouse and waterside hangars for flying boats and other water aeroplanes.

Here elaborate arrangements are being made for the upkeep of members' machines upon a co-operative basis, and it is hoped to reduce the cost of keeping an aeroplane to that of running a first-class motor-car.

It is also intended to inaugurate a sort of aerial taxi service for the use of members and their friends who do not possess machines of their own.

As regards the immediate future, it is intended to spend all revenue received in training men as pilots for the American Forces.

Naturally the operations of the club will be rather severely circumscribed by war conditions, but it is certainly worth while to make a beginning, so that there will be no delay with the scheme after the arrival of peace.

A MATTER OF ORGANISATION.

At the House of Commons Appeal Tribunal on Nov. 5th, reconsideration was given to the case of an engineer which had been adjourned in order that the man could go in the R.F.C. It was stated that he went to the local recruiting officer, who referred him to the Polytechnic, and they sent him on to Farnborough. He went down to Farnborough and had heard nothing since.

The Chairman (Sir D. Maclean, M.P.) said: What is the good of the Government making an announcement that highly-skilled men are wanted for aeroplane work? Whenever we try to help them men are passed from one department to another, and meanwhile they cram an engineering factory with grocers and drapers' assistants. It is absolutely hopeless. The case was adjourned for another fortnight.

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5. Dope is a thick liquid, so care must be taken to completely empty drums before returning them to us. Drums should always be turned upside down and allowed to drain.
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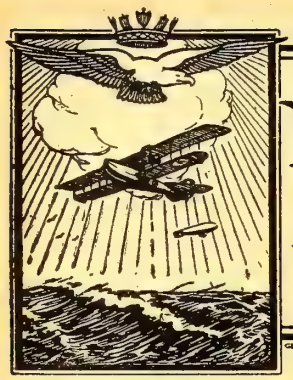
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NAVAL and MILITARY AERONAUTICS



FROM THE "LONDON GAZETTE."

Admiralty, Oct. 19th.

Oct. 25th.—Flt. Lt. Harris H. Square reinstated with his original seny. of Aug. 17th, 1915.

R.N.A.S.—Temp. Flt. Sub-Lt. to be temp. Flt. Lt.—E. O'D. Crean, Oct. 1st.

War Office, Oct. 30th.

REGULAR FORCES.—Establishments—R.F.C.—Mil. Wing.—Gen. List.—The following Equipment Officers, 2nd Cl., to be temp. Capts. while specially empld. :—Temp. Lt. E. R. Moxey, Gen. List; Lt. P. L. Hunting, North'd Fus., T.F., July 15th.

The following, from R.F.C., to be temp. Sec. Lts. :—1st Cl. Air Mechanic J. A. Brandt, July 31st; Flt. Serjt. A. Y. Moncrieff, Sept. 20th; Serjt. L. B. Hoyland, Oct. 2nd; Serjt. L. A. Herbert, Oct. 5th.

SPECIAL RESERVE OF OFFICERS.—Supplementary to Regular Corps.—R.F.C.—Mil. Wing.—Lt. (temp. Capt.) J. H. Kelly relinquishes his commission with a view to joining the American Army, and is granted the hon. rank of Capt.; Lt. F. L. Hambly relinquishes his commission with a view to joining the American Aviation Service, and is granted the hon. rank of Lt, Oct. 31st, 1917.

War Office, Oct. 31st.

REGULAR FORCES.—Staff.—Staff Capts.—Temp. Sec. Lt. E. J. Briscoe, Gen. List, R.F.C., and to be temp. Capt. whilst so empld., vice Lt. H. O'N. de H. Segrave, R. War. R.

Establishments.—R.F.C.—Mil. Wing.—The appt. of Bt. Lt.-Col. (temp. Brig.-Gen.) F. H. Sykes, C.M.G., Hrs., as a Wing Comdr., notified in the "Gazette" of Feb. 1st, 1915, is antedated to Nov. 22nd, 1914.

Flt. Comdr.—Sec. Lt. (temp. Lt.) B. K. D. Robertson, Glouc. R., T.F., from a Flying Officer, and to be temp. Capt. whilst so empld., Oct. 19th.

Equipment Officers, 1st Cl.—From the 2nd Cl., and to be temp. Capts. whilst so empld. :—Sec. Lt. (temp. Capt., without allowances) R. Holloway, Spec. Res.; Sec. Lt. (temp. Lt.) W. G. Cleghorn, R.G.A., T.F.; temp. Lt. M. O. Illingworth, Gen. List; Sec. Lt. (temp. Lt.) L. Davies, Spec. Res.; Sec. Lt. (temp. Lt.) A. E. Squire, Spec. Res.; temp. Lt. H. Crouch, Gen. List, Oct. 1st. Temp. Lt. J. H. Smith, Gen. List, Oct. 15th. Temp. Lt. S. E. H. Orde, Gen. List, Oct. 19th.

* * *

A dispatch from General Sir Charles Monro, Commander-in-Chief in India, "on military operations in the Indian Empire" from March 10th, 1916, to March 31st, 1917, covering operations in Aden, South and South-East Persia, Mekran, Jhalawan, and the North-West Frontier, says :—

The chief encounter with the Mohmands was on November 15th, 1916, when a force under Major-General Sir F. Campbell attacked and completely broke up an enemy lashkar estimated at 6,000. In his report Major-General Campbell drew attention to the effectiveness and efficiency of the armoured car unit, and especially commended the action of the aeroplanes of the Squadron R.F.C. in co-operation with artillery.

The following officer is mentioned in dispatches for gallantry and good service in operations on the North-West Frontier :—

R.F.C.—Bradley, Maj. C. R. S.

War Office, Nov. 1st.

REGULAR FORCES. — Establishments. — R.F.C. — Mil. Wing.—Sqdn. Comdrs.—From Flt. Comdrs., and to be temp. Majs. whilst so empld. :—Lt. (temp. Capt.) E. H. Johnston, Spec. Res., Oct. 15th. Lt. (temp. Capt.) B. E. Sutton, D.S.O., M.C., Yeo., T.F., Oct. 18th.

Flight Comdrs.—From Flying Officers, and to be temp. Capts. whilst so empld. :—Temp. Lt. R. H. Sharp, Gen. List, Oct. 14th. Temp. Lt. R. M. Wynne-Eyton, Gen. List, Temp. Sec. Lt. W. Durrand, Gen. List, Oct. 17th. Temp. Sec. Lt. H. Turner, Gen. List, Oct. 21st.

Park Comdrs.—Capt. C. G. Martyn, Mon. R., T.F., from an Equipment Officer, 1st Cl., and to be temp. Maj., while so empld., Nov. 2nd.

Equipment Officers, 1st Cl.—From the 2nd Cl., and to be temp. Capts. while so empld. :—Lt. C. G. Coe, Spec. Res., Sept. 1st. Sec. Lt. (temp. Lt.) C. H. Stevens, Spec. Res., Sept. 22nd. Lt. E. Graham, Spec. Res., Nov. 2nd.

Admiralty, Nov. 2nd.

The King has been graciously pleased to approve of the award of the following honours, decorations, and medals to officers and men of the Royal Naval Air Service.

Distinguished Service Order.

Flt. Sub.-Lt. Bernard Arthur Smart, R.N.A.S.

Distinguished Service Cross.

Flt. Comdr. Harold Austen Buss, R.N.A.S.—For his services on the occasion of a bombing raid on Bruges Docks on the night of Sept. 2nd-3rd, 1917, when numerous direct hits on the docks, submarine shelters, and railway sidings on the quay were obtained.

Actg. Flt. Comdr. Stearne Tighe Edwards, R.N.A.S.—In recognition of his services on the following occasions :—On Sept. 3rd, 1917, with his flight he attacked a two-seater Aviatik. The enemy machine was observed to go down in a vertical nose dive, and the enemy observer was seen to collapse in the cockpit. On Sept. 21st, 1917, he drove a two-seater enemy machine down out of control. On Sept. 23rd, 1917, he attacked an Albatros scout, which crashed into the sea. On the same date he attacked three Albatros scouts. One got on the tail of another officer's machine at very close range, shooting him up very badly. Flt. Comdr. Edwards attacked him from above, and the enemy machine turned on its back and went down in a vertical dive. He followed the enemy machine down to 8,000 feet, when its wings came off, and it fell to the ground.

Actg. Flt. Comdr. Howard John Thomas Saint, R.N.A.S.—For conspicuous bravery in attacking superior hostile formations of enemy aircraft. On Sept. 21st, 1917, he, with three other machines, attacked five hostile scouts. After getting to close quarters with one of them, he fired three bursts from his machine-gun, and drove it down completely out of control. On Sept. 23rd, 1917, while leading a patrol of eight scouts, he attacked a hostile formation of ten machines. One of these he drove down, diving vertically, out of control. He has forced down other machines completely out of control, one of them in flames, and has also shown great courage in attacking enemy troops and aerodromes with machine-gun fire from very low altitudes.

Flt. Lt. Harold Spencer Kerby, R.N.A.S.—For the great courage and initiative shown by him on many occasions, notably on Aug. 12th, 1917, when he attacked hostile machines returning from a raid on England. One hostile machine was driven down by him to the water, where it was observed to turn over.

Flt. Lt. John Fleming Jones, R.N.A.S.—In recognition of his services on the night of Aug. 15th-16th, 1917, when under adverse weather conditions, he dropped bombs on railway sidings at Ostend, causing a fire which continued to burn as long as it was under observation.

Flt. Lt. Arthur Frank Brandon, R.N.A.S. (since killed).—For services on Aug. 22nd, 1917, when he attacked single-handed an enemy formation returning from a raid on England, and brought down one of them in flames. As his aeroplane had been hit several times, he landed to change machines, and proceeded to attack again with a new one, making repeated attacks on individual machines, and pursuing the enemy formation over the North Sea to the Belgian coast, where he made a final attack.

Flt. Lt. Ronald Roscoe Thornley, R.N.A.S.—For gallantry and skill in aerial combats, notably on the following occasions :—On June 16th, 1917, whilst on patrol, he attacked a two-seater Aviatik, which fell to the ground inside our lines. On Aug. 15th, 1917, he attacked an Albatros scout and shot it down out of control. On Aug. 19th, 1917, he attacked an Aviatik and drove it down out of control. On Sept. 11th, 1917, he engaged one of three enemy machines, firing about fifty rounds when quite close, apparently wounding the observer at once, and shortly afterwards the enemy machine fell out of control.

Actg. Flt. Lt. Richard Pearman Minifie, R.N.A.S.—In recognition of his services on the following occasions :—On April 22nd,

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1917, he destroyed two enemy scouts. On Aug. 8th, 1917, he brought down an Albatros scout in flames. On Sept. 16th, 1917, he destroyed an Albatros scout. On Sept. 19th, 1917, he crashed an Albatros scout. In addition to the above-mentioned combats, he has driven down numerous enemy machines out of control, and on July 3rd, 1917, he attacked parties of troops on the road from a height of 200 feet. On Aug. 19th, 1917, he attacked two enemy aerodromes, firing 450 rounds at the hangars from a height of 400 feet. On Sept. 20th, 1917, he did excellent work in detecting and scattering troops massing for counter-attacks, flying at an extremely low altitude.

Actg. Flt. Lt. (now Flt. Lt.) Arthur Roy Brown, R.N.A.S.—For the excellent work he has done on active service. On Sept. 3rd, 1917, he attacked a two-seater Aviatik, in company with his flight. The enemy machine was seen to dive down vertically, the enemy observer falling over on the side of the fuselage shot. On Sept. 5th, 1917, in company with formation, he attacked an Albatros scout and two-seater, driving them away from our lines. One machine was observed to go down apparently out of control. On Sept. 15th, 1917, whilst on patrol, he dived on two Aviatiks and three Albatros scouts, followed by his flight. He dived several times and picked out one enemy scout, firing about 200 rounds, when the enemy machine went down out of control, spinning on its back. On Sept. 20th, 1917, whilst leading his flight, he dived on five Albatros scouts. Flt. Lt. Brown picked out one enemy machine and opened fire. One of his guns jammed, but he carried on with the other. The enemy machine went down out of control and over on its back, and remained in that position for about thirty seconds, whilst Flt. Lt. Brown continued firing until his other gun jammed. The enemy machine then disappeared in the clouds, still on its back. Another officer of the same patrol was later followed by four enemy machines, as he was separated from the formation. Both Fl. Lt. Brown's guns were jammed, but he dived on the enemy machines and drove them off, thus undoubtedly saving the pilot's life.

Actg. Flt. Lt. (now Flt. Lt.) Desmond Fitzgerald Fitzgibbon, R.N.A.S.—For exceptional courage and determination in leading offensive patrols against enemy formations, although often outnumbered by them. On Sept. 14th, 1917, he and his patrol of seven machines attacked a hostile formation of eight enemy scouts. In the combat that ensued three hostile machines were brought down completely out of control, one of these by Flt. Lt. Fitzgibbon, while the patrol suffered no casualties. On Sept. 26th, 1917, he attacked with his patrol of eight machines, fifteen hostile scouts. He himself engaged four different machines, one after the other, finally driving one down completely out of control.

Flt. Sub-Lt. Charles Beverley Sproatt, R.N.A.S.—Carried out a bombing attack on Bruges Docks on Sept. 4th, 1917, obtaining direct hits. He was subjected to heavy and accurate anti-aircraft fire, and his machine was shot about and radiator pierced.

Flt. Sub-Lt. Leonard William Ormerod, R.N.A.S., and Flt. Sub-Lt. John Southey Wright, R.N.A.S.—In recognition of their services on Sept. 5th, 1917, when they carried out a bombing attack on Bruges Docks, obtaining direct hits.

Flt. Sub-Lt. William Allan Scott, R.N.A.S.—In recognition of his services on the night of Aug. 15th-16th, 1917, when, in spite of difficult conditions, he dropped bombs on Thourout railway station and sidings. He circled the objective for an hour at a height of 3,000 feet, dropping his bombs singly, and achieved good results.

Obsr. Sub-Lt. Paul Brewsher, R.N.A.S.—In recognition of his services on the night of Aug. 15th-16th, 1917, when, with Flt. Lt. Jones, in spite of adverse weather conditions, he dropped bombs on railway sidings at Ostend, causing a fire which continued to burn as long as it was under observation.

DISTINGUISHED SERVICE MEDAL.

Ldg. Mech. R. W. Bager, O.N. F2176; Actg Air Mech., 1st Gr., H. G. Lovelock, O.N. J26402 (Po.); P.O. Mech. B. Hinckler, O.N. F311 (Ch.).

The following officers and men have been mentioned in dispatches :—

Sqdn. Comdr. C. H. Butler, D.S.O., D.S.C., R.N.A.S.; Flt. Sub-Lt. (now Flt. Lt.) C. H. FitzHerbert, R.N.A.S.; Flt. Sub-Lt. M. A. Harker, R.N.A.S.; Flt. Sub-Lt. E. B. Drake, R.N.A.S.; P.O. (E.) A. A. B. Cox, O.N. F17751.

* * *

The King has been pleased to approve of the award of the Distinguished Service Cross for services in action with enemy submarines to :—

Flt. Lt. T. H. Newton, R.N.A.S.

DISTINGUISHED SERVICE MEDAL.

Actg. Air Mech., 1st Gr., William Norman Blacklock, O.N. F4157.

The following officer is mentioned in dispatches :—

Flt. Sub-Lt. Tom Compton Trumble, R.N.A.S.

The following decorations have been conferred by the Allied Powers on officers of the British Naval Forces for distinguished services rendered during the war :—

CONFERRED BY THE EMPEROR OF JAPAN.

ORDER OF THE RISING SUN—3RD CLASS.

Capt. Murray F. Sueter, C.B., R.N. (Commodore, 1st Cl.).

CONFERRED BY THE PRESIDENT OF THE FRENCH REPUBLIC.

LEGION OF HONOUR.

CHEVALIER.

Wing Comdr. Christopher L. Courtney, R.N.; Sqdn. Comdr. B. L. Huskisson, D.S.O., R.N.A.S.

CROIX DE GUERRE.

Flt. Lt. (actg. Flt. Comdr.) R. Graham, D.S.C., R.N.A.S.
Flt. Lt. Basil E. F. Gregg, R.N.A.S.

THE RUSSIAN GOVERNMENT.

ORDER OF ST. VLADIMIR—4TH CLASS.

Lt. Comdr. (actg. Comdr.) Reginald Gregory, N.R.

* * *

CORRECTIONS.

In "Gazette" of Aug. 11th, for A.C., 2nd Gr., J. W. George, O.N. F20006, read Air Mech., 1st Gr., F. J. George, O.N. F1947.

In "Gazette," of Aug. 29th, 1917, for Flt. Lt. R. H. Collett, D.S.C., R.N.A.S., read Flt Lt. R. H. Collett, D.S.C., R.N.A.S.

In "Gazette" of Oct. 1st, 1917, for Flt. Lt. C. S. Colston, R.N., read Flt. Lt. C. S. Coltson, R.N.

WAR OFFICE, Nov. 2nd.

REGULAR FORCES.—ESTABLISHMENTS—R.F.C.—MIL. WING. —Asst. Instr. in Gunnery.—(Graded as an Equipment Officer, 3rd Cl.).—Temp. Lt. J. B. Roth, attd. Lan. Fus., and to be transfd. to R.F.C., Gen. List, Sept. 5th.

Gen. List.—The following, from R.F.C., to be temp. Sec. Lts. :—Actg. Cpl. N. F. Burch, Serjt. A. N. Stratton, Oct. 9th.

Memoranda.—Warrant and N.C.O.'s, from R.F.C., to be Sec. Lts. while serving with R.F.C. :—Temp. Serjt.-Maj. A. E. Houghton, Aug. 25th; Serjt. Maj. C. E. Cullen, Oct. 9th; Serjt. H. J. C. White, Oct. 11th.

* * *

The King has been pleased, by Letters Patent under the Great Seal of the United Kingdom of Great Britain and Ireland, bearing date Oct. 18th, to appoint : —

Major and Bvt. Lt.-Col. (temp. Maj.-Gen.) John Maitland Salmond, C.M.G., D.S.O., to be a member of His Majesty's Army Council.

WAR OFFICE, Nov. 3rd.

REGULAR FORCES.—ESTABLISHMENTS—R.F.C.—MIL. WING. —Wing Comdr.—The appt. of Capt. (temp. Maj.) J. C. Halahan, Res. of Off., notified in the "Gazette" of Sept. 14th, is antedated to Aug. 28th.

Sqdn. Comdr.—The date of the appt. of Maj. F. J. L. Cogan, is Aug. 22nd, and not as in the "Gazette" of Aug. 17th.

Flt. Comdrs.—From Flying Officers, and to be temp. Capts. whilst so empld. :—Lt. H. St. C. Smallwood, Ind. Army Res. of Off, July 19th; Sec. Lt. (temp. Lt.) D. G. B. Jardine, High. L.I., Oct. 20th; Sec. Lt. (temp. Lt.) R. T. C. Hoidge, M.C., R.G.A., Spec. Res. Oct. 22nd. The following Flt. Comdrs. are graded for purposes of pay as Sqdn. Comdrs. whilst empld. at a School of Special Flying, Sept. 22nd; Sec. Lt. (temp. Capt.) E. J. L., W. Gilchrist, Lrs., Spec. Res.; Lt. (temp. Capt.) H. H. Balfour, M.C., K.R. Rif. C., Spec. Res.

Balloon Co. Comdrs.—(Graded as Flt. Comdrs.)—And to be temp. Capts. while so empld. :—Sec. Lt. (temp. Lt.) W. Y. Walls, Arg. and Suth'd Highrs., from a Balloon Officer, Oct. 8th; Sec. Lt. (temp. Lt.) H. B. T. Hawkins, Spec. Res., from a Balloon Comdr. (graded as a Balloon Officer), Oct. 18th.

Equipment Officers, 1st Cl.—Temp. Lt. (temp. Capt.) A. M. Thom, M.C., Gen. List, from a Flt. Comdr., and to retain the rank of temp. Capt. while so empld., Aug. 13th; Sec. Lt. (temp. Lt.) E. Holloway, Spec. Res., from an Equipment Officer, 2nd Cl., and to be temp. Capt. while so empld., Sept. 8th.

OVERSEAS CONTINGENTS. — CANADA. — Quebec R.—Temp. Capt. J. A. Le Royer, M.C., is secd. for duty with the R.F.C., April 15th.

Central Ontario R.—Temp. Capt. L. E. D. Stevens is secd. for duty with R.F.C., Sept. 28th.

British Columbia R.—Temp. Capt. A. R. C. Morton is secd. for duty with the R.F.C., Oct. 2nd.

* * *

The King has been pleased to award the Military Medal for bravery in the Field to the following Non-Commissioned Officers and Men :—

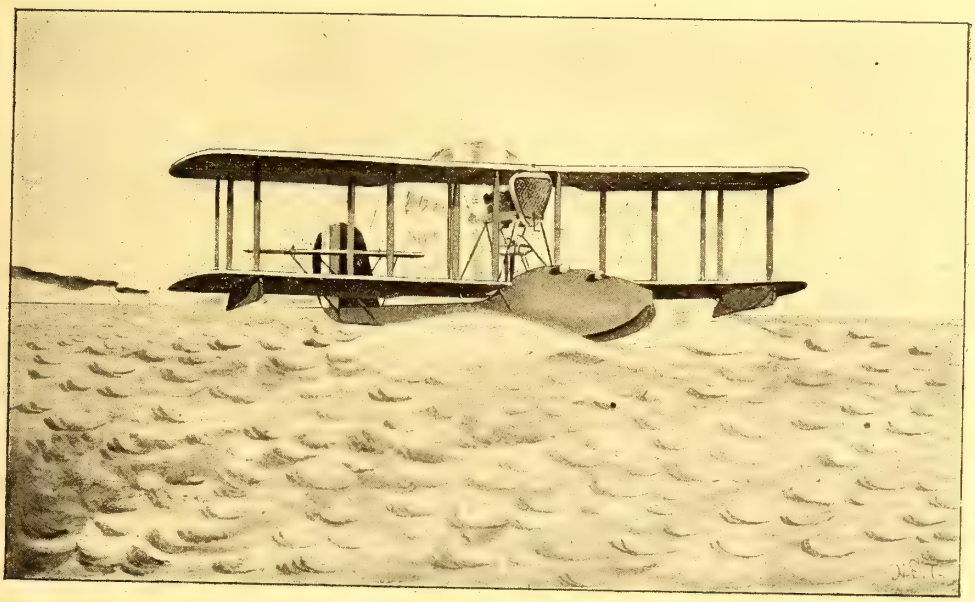
7546 1st Cl. Air Mech. P. E. Gudgeon, R.F.C. (Derby).
8361 1st Cl. Air Mech. W. G. Hodges, R.F.C. (Glastonbury).
33549 1st Cl. Air Mech. J. A. Newell, R.F.C. (Halifax).

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Meritorious Service Medal.
Amendments.

"Gazette" dated March 12th, 1917.—For 18471 Cpl. G. Dunn, R.F.C., read 1874 Cpl. G. Dunn, R.F.C.

War Office, Nov. 5th.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing.—Asst. Instrs. in Gunnery (graded as Equipment Officers, and Cl.).—From Asst. Instrs. in Gunnery (graded as Equipment Officers, 3rd Cl.):—Lt. W. W. Moser, Bord. R., Spec. Res.; temp. Sec. Lt. O. Spain, Gen. List, and to be temp. Lt. whilst so empld., Sept. 1st. Capt. G. H. Salaman, Linc. R., T.F., Sept. 5th. Capt. P. K. Paul, High. L.I., Spec. Res.; Sec. Lt. F. Chisnall, W. Rid., T.F., and to be temp. Lt. whilst so empld., Sept. 22nd.

Gen. List.—Qrmr. and Hon. Lt. E. J. Parker, M.C., to be temp. Lt. while serving with R.F.C., Aug. 20th.

FROM THE COURT CIRCULAR.

Buckingham Palace, Oct. 31st.

The following Officers had the honour of being received by His Majesty, when The King invested them with the Insignia of Companions of the Order into which they have been admitted:

The Distinguished Service Order and the Military Cross and Bar.

Captain Gilbert Murlis-Green, R.F.C.

The Distinguished Service Order.

Lt.-Col. Arthur Godman, Yorkshire Regt. and R.F.C. (also to receive the D.S.O. awarded to his brother, Lt.-Col. Lawrence Godman, late Royal Artillery).

* * *

His Majesty then conferred decorations as follows:—

The Distinguished Service Cross.

Flt. Comdr. James Struthers, R.N.A.S.
Flt. Lt. Charles Coltson, R.N.
Flt. Lt. Harold Kerby, R.N.A.S.
Flt. Lt. Arthur Elliott, R.N.A.S.
Flt. Lt. John Hoare, R.N.A.S.
Flt. Lt. Alfred Carter, R.N.A.S.
Flt. Lt. William Anderson, R.N.A.S.
Flt. Lt. Charles Morrish, R.N.A.S.

The Military Cross.

Major Cecil Lewis, R.F.C.
Lt. Walter Pierce, R.F.C.
Sec. Lt. Richard Hill, R.F.C.

NAVAL.

The following appointments have been made in the Royal Naval Air Service:—

Oct. 30th.—Temp. commissions as Lt. (R.N.V.R.) have been granted to O. G. Wemyss and P. N. B. King, seny. Oct. 27th and Nov. 5th.

Nov. 3rd.—Lt. (Temp.).—J. G. Y. D. Morgan, promoted to Lt. Comdr. (temp.), seny. Oct. 31st.

Flt. Sub-Lt. (Temp.).—H. E. Parker, promoted to Flt. Lt. (temp.), seny. Oct. 1st.

Sub-Lt. (temp.).—F. C. B. Lefroy, promoted to Lieut. (temp.), seny. Oct. 31st.

Admiralty Communiqués.

Oct. 31st.—On the night of the 29th, the Royal Naval Air Service carried out raids on Sparappelhoek and Varssenaere aerodromes. Visibility was excellent, and accurate shooting was made.

All machines returned safely.

Nov. 1st.—During October 31st a bombing raid was carried out by naval aircraft on Sparappelhoek aerodrome. Targets were partially obscured by clouds, making results difficult to observe.

Many offensive patrols have been carried out, during which one hostile machine was shot down out of control.

All our machines returned safely.

Nov. 3rd.—During Nov. 4th numerous patrols were carried out by the Royal Naval Air Service. One two-seater enemy machine was brought down in the sea, another two-seater driven down damaged, and a scout probably destroyed.

A bombing raid was also carried out this afternoon on Engel aerodrome. Bombs were seen to fall among the hangars and sheds in the aerodrome. The formation was attacked by enemy machines, two of which were driven down out of control.

All our machines returned safely.

The Casualty List.

Reported Nov. 2nd.

Accidentally Killed.—Brandon, Flt. Lt. A. F., R.N.
Missing.—Linnell, Flt. Sub-Lt. H. G. B., R.N.
Macdonald, Flt. Sub-Lt. A., R.N.
Morang, Proby. Flt. Off. G. H., R.N.
Smith, Flt. Sub-Lt. J. S., R.N.
Dangerously Wounded.—Davidson, Flt. Sub-Lt. W. M., R.N.
Wounded.—Clapperton, Flt. Sub-Lt. W. H., R.N.
Pownall, Flt. Sub-Lt. C. H., R.N.
Accidentally Injured.—Webber, Flt. Sub-Lt. A. E., R.N.
Previously reported Missing, now reported Prisoner.—Gray, Flt. Sub-Lt. A. T., R.N.

PERSONAL NOTICES.

Death.

BRANDON.—Flt. Lt. Arthur Frank Brandon, D.S.C., R.N., who was killed on Oct. 26th as the result of a collision in the air, was the third son of the late Charles Brandon, of Montreal, Ladysmith, Natal.

He was educated at Michaelhouse School and Cedara College, Natal, and he served with the South African contingent throughout the German South-West African campaign, after which he came to England and received a commission in the R.N.A.S. He was sent to Salonika in 1916, where he did good service, and was invalided home last July, and has recently been stationed at an aerodrome on the south-east coast.

He had recently brought down a Gotha, for which service he was awarded the Distinguished Service Cross. His commander says:—"He was one of our best air pilots."

* * *

While a practice flight was taking place in East Kent on Saturday afternoon, Nov. 3rd, a serious accident happened to one of the larger type of British machines. It was carrying several passengers, in addition to the pilot, and had almost reached the ground when it suddenly burst into flames. Three men were killed and two seriously injured.

Engagements.

ENGLAND—CARR.—A marriage has been arranged, and will take place early in December, between Squadron-Commander T. H. England, D.S.C., R.N., youngest son of Mr. and Mrs. G. England, of Oakdene, Walton-on-Thames, and Doreen, eldest daughter of the late Lieutenant-Colonel A. N. Carr, Indian Army, and Mrs. Drinan, 4, North Court Mansions, East Twickenham.

MEADE—CUBITT.—The marriage arranged between Flt. Lt. W. A. Meade, R.N., and Vera Cubitt, eldest daughter of Count and Countess Riccardi-Cubitt, will take place, leave permitting, on Nov. 19th, quite quietly, in the private chapel at Eden Hall, Edenbridge, Kent.

WOODS—PERKINS.—The marriage arranged between Flt. Lt. Norman Edward Woods, R.N., and Miss Florence Innes Perkins will take place at St. Mary's, Wimbledon, on Saturday, November 17th. No invitations are being sent, but all friends will be welcome at the church.

Birth.

PEEL-ROSS.—On Nov. 2nd, at Clevelands, Westgate-on-Sea, the wife of Lt. R. Peel-Ross, D.S.O., R.N., Wing Commander, R.N.A.S.—a son.

His relatives will be very glad to receive any information of Flt. Lieut. Langley H. W. Smith, D.S.C., R.N.A.S., who was reported missing on June 13th last. Any officer who can provide any information about Mr. Smith is asked to communicate with Mrs. J. M. Boyd, Craigflower, Torryburn, Fife, N.B.

MILITARY.

G.H.Q. Communiqués.

Oct. 30th, 9.30 p.m.—On the 29th inst. there were a few fine intervals, during which our aeroplanes observed for our artillery and fired several thousand rounds from their machine-guns at the enemy's troops in trenches and on roads.

Over 100 bombs were dropped on hostile billets at Roulers and elsewhere during the day, and again at night.

In air fighting, four hostile machines were brought down and one driven down out of control. Two of our aeroplanes are missing.

On the night of the 29th-30th inst. our machines again attacked the railway station and lines around Saarbrücken, in Germany, and bombs were seen to burst with good effect. All our machines returned, though the weather conditions were exceptionally bad.

This morning, at 11 a.m., twelve of our machines went farther afield and attacked the munition works and gasworks at Pirmasens, twenty miles beyond Saarbrücken.

Bombs were seen to burst on the factories and on the gasworks with excellent results. Many photographs were taken

The weather was good, and all our machines returned.

Oct. 31st, 9.20 p.m.—On the 30th inst. a strong gale, with driving rain, prevented much flying being done, though our aeroplanes co-operated with the attacking troops on the battle-front throughout the greater part of the day, and accomplished much successful artillery work.

(*Continued on page* 1371.)

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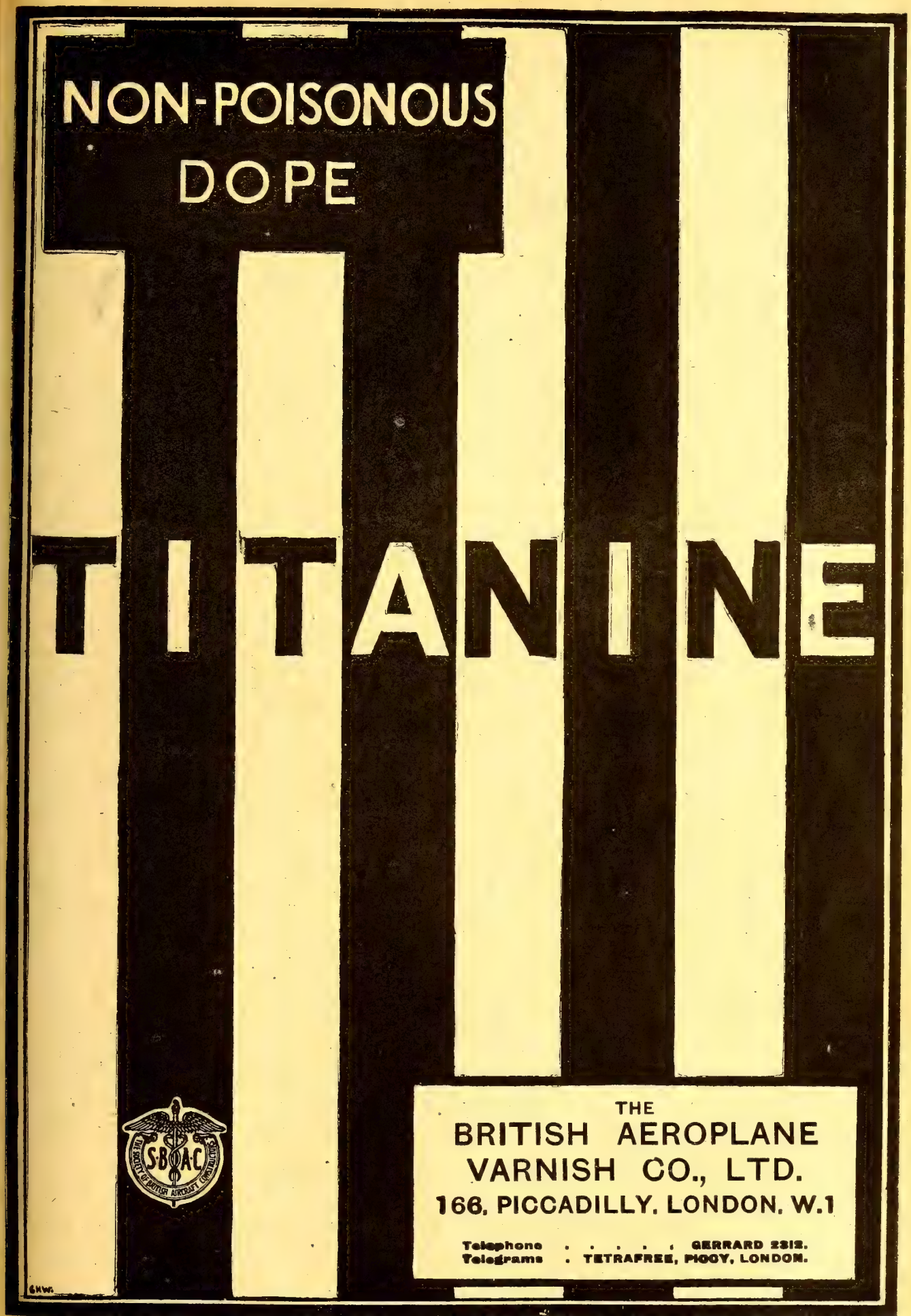
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The British Aircraft Industry.

BY CHARLES L. FREESTON.

XXIX.—PARNALL AND SONS.

So long as the war lasts, and all productive energy is confined to War Office or Admiralty machines, it follows that aeroplane constructors who were not prominent as such before the fateful August of 1914, must remain unknown to the public at large, no matter what useful work they may be performing in the way of increasing the output of much-needed machines.

The Right Nucleus.

Particularly valuable, however, where war-time emergencies are concerned, has been the entry into the aircraft industry of firms which were already engaged upon one department or another of the woodworkers' craft.

Everybody, of course, has something to learn in taking up a new line of effort, but a firm already familiar with woodworking requirements, and possessed of works equipped with suitable plant, to say nothing of a nucleus of hands trained in the fashioning of timber, has much in its favour, and the minimum of leeway to make up when embarking upon the fulfilment of Government contracts for aeroplanes.

An Old-established Business.

A typical example is the old-established firm of Parnall and Sons, of Bristol, who have now been engaged upon aeroplane production for both the Admiralty and the War Office since June, 1915

Formerly they were known all the world over as shop-fitters, the business having been founded so far back as 1820. Mr. George G. Parnall is now the general manager of the concern. It is actually owned, however, by the famous firm of weighing machine and scale makers, W. and T. Avery and Co., of Birmingham.



Mr. George G. Parnall.

Admiralty Contracts.

Mr. George Parnall was quick to realise, in the early months of the war, that the firm's energies might usefully be applied to aeroplane production, having regard to its experience of woodworking and its large staff of skilled workmen. He approached the Government accordingly, and by June, 1915, was at work on an Admiralty contract for 150-h.p. Short seaplanes.

Before this was completed a further contract had been received for 250-h.p. Shorts, and this was followed by others for Canton, Unné, and 80-h.p. Gnôme Avros. A number of 225-h.p. Shorts were also re-built, and large War Office contracts for other types are now in hand.

Many Extensions.

The original works of Parnall and Sons at Bristol were situate at Broadmead, but various extensions have since become necessary. A factory in Mivart Street, Eastville, formerly owned by a firm of clothing manufacturers, was acquired for the purposes of aeroplane production and equipped with both woodworking and metal-working plant.

A spacious erecting shop was secured by the conversion of the Coloseum in Park Row. Another factory was taken over at Brislington, and is used for experimental work and also for the manufacture of propellers, of which Parnall's have built large numbers for Rolls-Royce, Sunbeam, Clêrget, and other well-known engines.

Two more factories were acquired, one at Baptist Mills, and one at Fairfax Street, and used for plane-making and assembling and covering and doping, as also for the extension of female labour in the direction of metal-working.

Useful Co-operation.

When aeroplane production was first embarked upon the firm had no difficulty in training its large staff of woodworkers to the requirements of the new field of labour, while its existing plant was, of course, suitable in kind. In respect of metal-working, however, special efforts had to be made, and recently this branch has been considerably extended.

Mr. Gilbert C. Vyle, the managing director of Avery's, has displayed keen interest throughout in the aircraft development of Parnall and Sons, and he has induced his co-directors to set apart a portion of the ironworks at Soho Foundry, Birmingham, in order to ensure an increased output of metal parts for the Bristol organisation.

The Soho works, of course, possess great facilities for this class of work, and as some hundreds of men have been put onto the production of metal parts for aeroplanes the Bristol works will now be materially assisted in the way most needed, and the output of aeroplanes will be materially increased accordingly. Contracts are in hand, moreover, which will necessitate the taking on of a number of new hands at Bristol, although the number already engaged is considerable.

GOOD WORK DONE.

A tour through the works affords every evidence of sound management and the employment of up-to-date methods, and I saw enough to leave no cause for surprise that the Parnall machines have given very good accounts of themselves and are well reported upon by those who have used them in various fields.

Mr. George Parnall, as the guiding spirit of the concern, is ably supported by his staff, and notably by Mr. A. E. Murray, the works manager, and Mr. A. P. Hartnell, the technical manager. Captain Keith-Davies (late R.F.C., and quite one of the pioneers of aviation), is the firm's pilot, and carries out the seaplane tests at Hamble. Captain Keith-Davies will be remembered by old timers as working with Mr. Grahame-White in some of his earliest exhibition flights, and as a clever pilot of the Hanriot monoplane at Brooklands. He is an engineer of ability and experience, and gave up an excellent motor business to join the R.F.C. at the outbreak of war.

AFTER THE WAR.

Finally it should be mentioned that Parnall and Sons are fully convinced of the commercial future of aviation, and have not entered upon the new business as a war-time expedient alone, but have every intention of continuing the manufacture of aeroplanes when peace comes to be declared. Before that time, it may be stated with certainty, they will have emerged from the realm of producers only, and will have built machines of their own distinctive design, upon which they are now engaged.

The Education of Apprentices.

On October 18th a representative deputation from the North-East Coast Institution of Engineers and Shipbuilders waited upon the President of the Board of Education (the Right Hon. H. A. L. Fisher, M.P.) to submit for his consideration certain matters relating to the education of apprentices to the engineering and shipbuilding industries.

The Duke of Northumberland, introducing the deputation, informed the President that the North-East Coast produced over one-half of the Kingdom's warship and mercantile tonnage and over one-third of the Kingdom's total output of marine engines. The marine engineering and shipbuilding industries employed about 14,000 apprentices.

Mr. Herbert Rowell stated that the deputation desired to emphasise certain features of the Report on the Education of Apprentices, which was issued recently by the North-East Coast Institution, and to submit several recommendations. The Education Bill, which Mr. Fisher introduced to the House of Commons in August, paved the way to a serious consideration of that important side of education and encouraged them to believe that their representations would be sympathetically heard.

The Report sprang from a demand for an efficient system of technical education for their apprentices. It rejected developed elementary day schools and laid it down that the most suitable type of school for the prospective engineer was the junior day technical school. It requested that the latter should be regarded as a distinct type of higher school, in no sense inferior to a secondary school, which boys could enter direct from the elementary schools at 12 to 13 years of age for a full-time three years' course of directed preparatory education before beginning their apprenticeship. It demanded that adequate provision of these schools should be made in the North-East Coast area. In the establishment, management and general supervision of these schools, it was hoped that the North-East Coast Institution (representing the employers' associations already enumerated) would act on a body, which should also be representative of employees, in consultation with the local education authorities.

The Institution endorsed in the strongest possible terms the regulations of the Board of Education, which required that a reasonable proportion of the members of the teaching staffs of such schools must have had practical trade experience of the occupations for which the schools furnished educational preparation. The Institution regarded it as equally important that the inspection staff of the Board of Education, charged with the supervision of the work of these and allied schools, should be technical men with experience in the industries. It was also urged that the advisory body just referred to should have full opportunity of consultation with the inspection staff and with the chief administrative official immediately responsible to the Secretary of the Board of Education.

Mr. Rowell referred in detail to the Board's regulations for junior day technical schools, and expressed the view that the declaration in the regulations that they were "not intended to promote the establishment of courses planned to furnish a preparation for the professions, the Universities, or higher full-time technical work" was open to grave exception, as viewing the work of such a school as lying within a cul-de-sac. The Institutions scheme regarded such schools as places where the preparatory education of a prospective engineer or shipbuilder should be well and truly laid and where provision was made for the continuance of that education in a senior technical school during the apprenticeship of the brightest pupils and continuing to the University. The point was, surely, one of spirit rather than of administration, for he could not imagine that the Board would deliberately arrest a sequential scheme of development, such as that set out in the Institution's Report.

Nevertheless, the deputation thought it desirable to have a definite assurance on the point. They realised that, if the scheme of education indicated in the Report came into force, the engineering and shipbuilding companies concerned would be called upon to bear not only the cost of providing their apprentices with the facilities necessary under the scheme, but also a heavy share of the increase of taxes thereby entailed. They believed, however, that the extra expense involved would be returned to the community in a far higher degree, on the one hand by the greater skill of the workman, and, on the other, in the broader mental outlook, balance and initiative of the individual. They would like to see such a scheme adopted nationally, but, if that could not be done at first, they were prepared to recommend its adoption on the North-East Coast.

The old family relations of master and apprentice, which raised craftsmanship to a dominating height, were gone, but they could at least see that the neglect and exploitation of apprentice labour that had largely prevailed for half-a-century died also. The close personal instruction of the old days of the guilds could, at any rate, be replaced by a high standard of collective training with, where the size of the works allowed, a suitable person to act as mentor and guide to the apprentices. They earnestly hoped that their work in that matter would not dissipate like a cloud of escaping steam, but that, through the machinery Mr. Fisher would set up, it might become a source of energy and inspiration to the rising as well as to future generations.

Sir Percy Girouard, of Armstrong-Whitworth, Ltd., said that, on behalf of the North-East Coast Engineering Trades Employers' Association, he endosed in every way, generally speaking, the proposals of the Institution. He realised that the scheme would mean a great addition to the number of apprentices in some departments, but he thought that most companies were prepared to meet that expense as the Institution's proposals, if carried through, would give them much more highly-educated apprentices, who would have much greater chances of going into the higher spheres in engineering, in management, and even administration, than in the past.

Colonel R. Saxton White endorsed the Report and described the progress of the apprentices' school in connection with Messrs. Armstrong Whitworth's Walker Shipyard. That school started three years ago with 40 students and now had 74. The training was voluntary on the part of the boys, but he thought they were beginning to appreciate its possibilities of advantage.

Principal Mundella and Mr. Percival Sharp adduced valuable argument in support of the aims of the deputation.

Replying, the President of the Board of Education said he regarded that deputation as a very encouraging sign of the interest large employers of labour were taking in the promotion of technical education in this country. He was sorry to say that he found, all over the country, a very considerable amount of suspicion among working-people so far as technical education was concerned.

However, it was part of the duty of that Board, in co-operation with the industries and with local education authorities, to dispel that suspicion. He would give very careful consideration to the points raised by the deputation as to the regulations governing the junior day technical schools. The point with respect to finance could not be settled without consultation with the Treasury, and he should have to review the whole circumstances of the case before arriving at a decision.

Hitherto, a certain number of forward and intelligent employers had provided continuation schools for their workmen, and he had never heard an instance in which an employer who had taken that step had regretted it. Employers who did take that step were, of course, exposed to the competition of other employers who had not taken the step, but he believed that, when the obligation of providing day continuation classes for pupils who had left school before the age of 16 became general—as was proposed by the new Education Bill—and was imposed upon the whole country, there would be many more employers ready to take advantage of the facilities given them under the Bill, and to provide classes in connection with their work.

The Duke of Northumberland thanked Mr. Fisher for having received the deputation.



From a painting by Mr. SANDFORD PITT.

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BY STEPNEY BLAKENEY.

TRUING UP.

Having erected the wings on the machine complete, and tested the angle with the protractor, we find this is only 2 deg. instead of 3½ deg. This shows that the wings require lifting at the tips, so we must proceed to lift them with the wires.

The first thing to do then will be to increase the tension of the landing wires to bring the wings upwards, starting with the inner bay landing wires attached to the tops of the centre plane struts and finishing up with the outer landing wires. Only a slight alteration in the tension may be necessary, this being obtained with a few turns of the barrel of the strainer, or "turnbuckle" as it is called officially, or with a few turns of the barrel of the streamline wires, whichever are used.

After this the lift wires may require attention, for tightening up the landing wires will have probably tightened them up too much, owing to the consequent slight deformation of the parallelogram which is formed by the vertical struts on each side and the top and bottom spars above and below. The lift wires will be slacked off to the required tension by adjusting the turnbuckles to suit.

Having done this to both the back and front spar, it will be as well to try the planes again with the shop protractor, and it is possible that with luck the right dihedral angle may have been obtained. If not, it is necessary to keep on doing it till the angle is correct.

THE ANGLE OF INCIDENCE.

We must now turn our attention to the angle of incidence, this being checked by placing the straight edge or base of the protractor on the under side of the wing, one end of the protractor being on the trailing edge and the other on the leading edge, and observing the angle indicated. If the angle is too flat, then the leading edge wants raising.

This is done by tightening the incidence wires which are attached to the top of the rear strut and run to the bottom of the front interplane struts. This has the effect of lifting the leading edge of the wing. The opposite incidence wires from the top of the front struts to the bottom of the rear struts must be slacked off to match.

This being done, the angle of incidence should be again tried with the protractor as close as possible under the centres of the struts, and midway in between as well. If the angle of incidence is now found to be correct, then the erection of the wings may be considered complete, with the exception of the controls.

The ailerons must now be assembled in their places on the planes, if this has not been already done when assembling the wings, as it should have been. And the aileron control wires should be fitted.

MOUNTING THE TAIL UNIT.

The tail plane can now be fastened onto the end of the fuselage. As this is of a fixed position design, it simply means that the attachment bolts have to be put in and the nuts screwed up and split-pinned, the whole being attached to the metal attachment plates provided for it.

The small bracing wires from the tail-plane spars to the fuselage must also be attached. These, of course, are for the purpose of staying and bracing the tail plane and preventing it from twisting in the air when flying.

THE FIN.

The fin will have to be placed in its position on the top of the tail plane and bolted on, and the stay wires attached. The fin being made of steel tubing, as previously described, it may hardly be necessary to mention that the rear end of the fin is formed with a stout steel tube, onto which are attached the hinge fittings for the rudder.

THE RUDDER AND ELEVATOR.

The rudder will now be the next thing to attach, and it is at this stage, and in other similar stages, that accuracy of work and the necessity for care in assembling hinge fittings will come forward. Owing to the fine limits of deviation allowed from the fixed measurements of hinges, any slight error will lead to scrapping the whole job, with consequent waste of time and labour and material.

The rudder is attached to the steel tube by means of the small hinge fittings, which in this case are of the usual male and female design, with a small pin passing through both portions to keep them together. The pins are kept in their places in the hinge fittings by means of a washer and small split-pin.

The elevator-flaps will be similarly attached to the rear edge of the fixed tail plane.

WHAT HAS BEEN DONE.

We have now erected all the principal parts of the machine. To the front of the Fuselage are attached the Upper and Lower Main Planes, with their Ailerons, and the Centre Section Plane. At the tail end there is the Tail Plane, to which are attached the Elevators. And on the top of the fuselage at the tail end is the Fin, to which is attached the Rudder.

THE LEADING EDGES.

Before proceeding with the fitting up of the control cables and other work, we must accurately test the leading edges of the wings to see that they are correctly in line, and also that they are at right angles to the centre line of the fuselage, otherwise the flying of the machine will be affected; also the tail plane, fin, and rudder must be clecked.

We will proceed first to check the leading edge of the Lower Main Planes, because it is more convenient to do so than to get up to the leading edge of the Top Main Planes.

For the purpose of ascertaining that the leading edges of the Lower Planes are accurately in line with each other we will suspend three plumb-bobs from each leading edge. Then we will strain a line across all the six plumb-lines, starting from the left plumb-line and finishing at the extreme right-hand plumb-line.

It follows that, if the left-hand plumb-line is suspended from the tip of the left-hand lower plane, and if there are on this plane one plumb-line in the middle and one close up to the fuselage, and if there are a similar lot suspended from the right-hand lower plane, and if a line is stretched across all of them, starting from the left and ending at the extreme right-hand one, and if the whole of the leading edge is straight, the line which is strained across will lightly touch all these plumb-lines and thereby prove that the planes have their leading edges in a continuous straight line. This is most important.

SQUARING THE PLANES.

So far we have only proved that the leading edges are in a continuous straight line. What we now have to do is to prove accurately that this straight line is dead at right angles to the centre line through the axis of the engine and fuselage.

We must therefore drop a plumb-line from the exact centre of the air-screw boss and drop another plumb-line accurately true with the centre of the rudder post. Then we must get two trestles or some objects having sufficient weight in themselves to allow a line to be tied to each and strained taut. This line must reach from the plumb-line of the screw boss to the line suspended from the rudder post. As this line reaches from end to end of the machine, it naturally will cut the line representing the leading edge of the lower main planes.

Having got these lines set out and cutting each other, the next thing to do is to find out if the line along the leading edge of the planes is at right angles to the line from end to end of the machine. This will be done with a large set-square.

CHECKING THE UPPER PLANES.

Having done this necessary checking, and having found that the Lower Planes are correct, we can start to check the Upper Main Planes. In checking the Upper Main Planes to see if their leading edge is parallel with the Lower Main Planes we must bear in mind that the Upper Planes have a forward stagger of six inches. Therefore, when the plumb-line is dropped down over the edge of the Upper Main Plane near the root of the wing, namely, at the inner end where it joins the Centre Section Plane, we shall find that the plumb-line, if the wings are correct, is six inches in front of the leading edge of the Lower Main Plane.

WHERE CARELESSNESS IS DISCOVERED.

This is as required; that is to say, if the wings are correct. We will hope they are, because, otherwise, it will entail some expensive alterations, not in material, but in the time taken, to say nothing of the annoyance. It is at this point that inaccurate work and measurements tell, and those who have scamped their work are found out, as the accuracy of the erected wings is vital to the machine.

It will be as well to leave the two lines strained taut, namely, the line representing the centre line of the fuselage and engine, and the line representing the leading edges, as from these lines we can check the squareness and truth of the tail plane, which will next have to be dealt with.

(To be continued.)

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(As seen by an Engineer.)

THE MACHINE.

The perfection of design of the Aeroplane of whatever type involves the perfect distribution of the most effective material, without redundancy, in accordance with ultimate stress. When tuned up, the whole machine is in condition to sustain elastically in the Air the maxima stresses for which each part has been designed. To attain the essential lightness, the machine must be so designed and of such materials that when these maxima stresses are imposed upon it in the Air, every part is working within an equal margin of the limit of elasticity.

But whatever factor of safety is given with a machine, a really great Aviator will explore his margin, and, in the ecstasy of combat, will trespass over its extreme edge. Then, officially, the machine should have gone; but that it didn't is where the personal equation of Luck comes in.

THE MAN.

It is the business of the great Aviator when engaging an enemy to execute within the elastic limit of his machine every kind of manœuvre of which he is master. Looping the loop, side-slipping and spiralling, diving and swooping, flattening out and recovery, and all the like marvellous tricks of air tactics put terrific strains on a plane. Take 100 as the breaking strain. For peace-time-commercial-purposes a margin of strength of at least 25 per cent. would be demanded; some users would require 50 per cent. But fighting men don't work to formulæ, but to the achievable limit. A *good* military Aviator works along an edge of 90 per cent. of the elastic limit, with peaks of stress approaching 95 per cent. The *really great* Aviator, whose nerves extend to the tips of his wings, so that he himself feels these strains in every part of their and his fibre, works along an edge of 95 per cent., with peaks of stress extending to perhaps 97½ per cent. of the elastic limit. If, with all his sentience, accumulated knowledge and experience, he exceeds this narrow margin of 2½ per cent., his machine is on the very brink of collapse of material and deformation of structure; for elongation and destruction of material begin the moment the 100 per cent. point is passed. He feels in his soul when the limit is reached. If he actually passes the limit of elasticity—Snap—a wing goes, and it is the end for him.

IN THE FIGHT.

The great Aviator knows perfectly well the extreme risks he is taking in sailing thus along the edge of his elastic limit, and, that while so doing, his life is not worth a moment's purchase. Say what you will, the realisation of these risks cannot be without strain effect upon his mentality. In such a crisis the Aviator is himself mentally and physically sailing along the edge of his own elastic limit.

It is because at such a moment the "GUARDIAN ANGEL" PARACHUTE can substantially relieve his mind of one element of stress, in that, if by miscalculation the limit is exceeded, he knows he yet will have a good sporting chance of safety, and so is able to banish any thought of self, that we claim that its possession broadens an Aviator's command of his machine, which may make just all the difference between failure and success.

It is the last foot; the last pound; the strenuousness of the last effort, which wins the last trick and the game.

ON THE TRAINING GROUND.

Through sheer lack of experience and control, novices while working in the neighbourhood of 50 per cent., will get sudden and unexpected peaks of 80 per cent. and 90 per cent., and an especially unfortunate learner unconsciously exceeds the 100 per cent., crashes his machine, himself, and sometimes his instructor. These cases are frequent, and it is to save the man, after the machine is broken, that we want to see the "GUARDIAN ANGEL" PARACHUTES in common use on the Training Grounds. To make it a sure and reliable Life-saver for our Air Services has been the one aim and object of all the work and money expended upon its gradual development into the present perfected and standardised form.

The Parachute and its principles are all right—what only remains is the settlement of its best application to all types of Aeroplanes, and in this the varied experience of the men in the Air, whose lives it has saved, will form our most reliable guide.

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The Vibrations' Method of Tuning-Up Aeroplanes.

By INGEGNERE CARLO MAURILIO LERICI, of the S.I.A.

In the workshops for aeronautical construction of the Società Italiana Aviazione (F.I.A.T. Co., Turin), as well as in several other aeroplane factories, a new method for regulating machines was first successfully introduced about a year ago.

This method utilises the well-known phenomena of vibratory resonance for measuring the tensions of shrouds—cables and wires—and enables, therefore, the operator to "tune up" the machine with a precision and constancy which cannot be reached by the empirical proceedings still in use in most factories.

The consequences of a wrong regulation, namely, lack of symmetry and excessive bracing tensions, are too known for being insisted upon.

It is sufficient to remember how the low safety factor of modern machines may be influenced by an inaccurate tuning. The deformations of wood elements, due to excessive initial compressive stresses, as well as the wrong straining of bracing wires, are often responsible for a decrease of 15-20 per cent. of the safety factor. This is confirmed by the results of static tests carried on body-cellules of several up-to-date machines of various types.

The "vibrations method" makes use of a simple frequency-meter, by means of which the frequency of vibration of a straightened wire can be easily measured. This value is proportional to the tension according to the formula:

$$T = \frac{4l^2w}{g} n^2$$

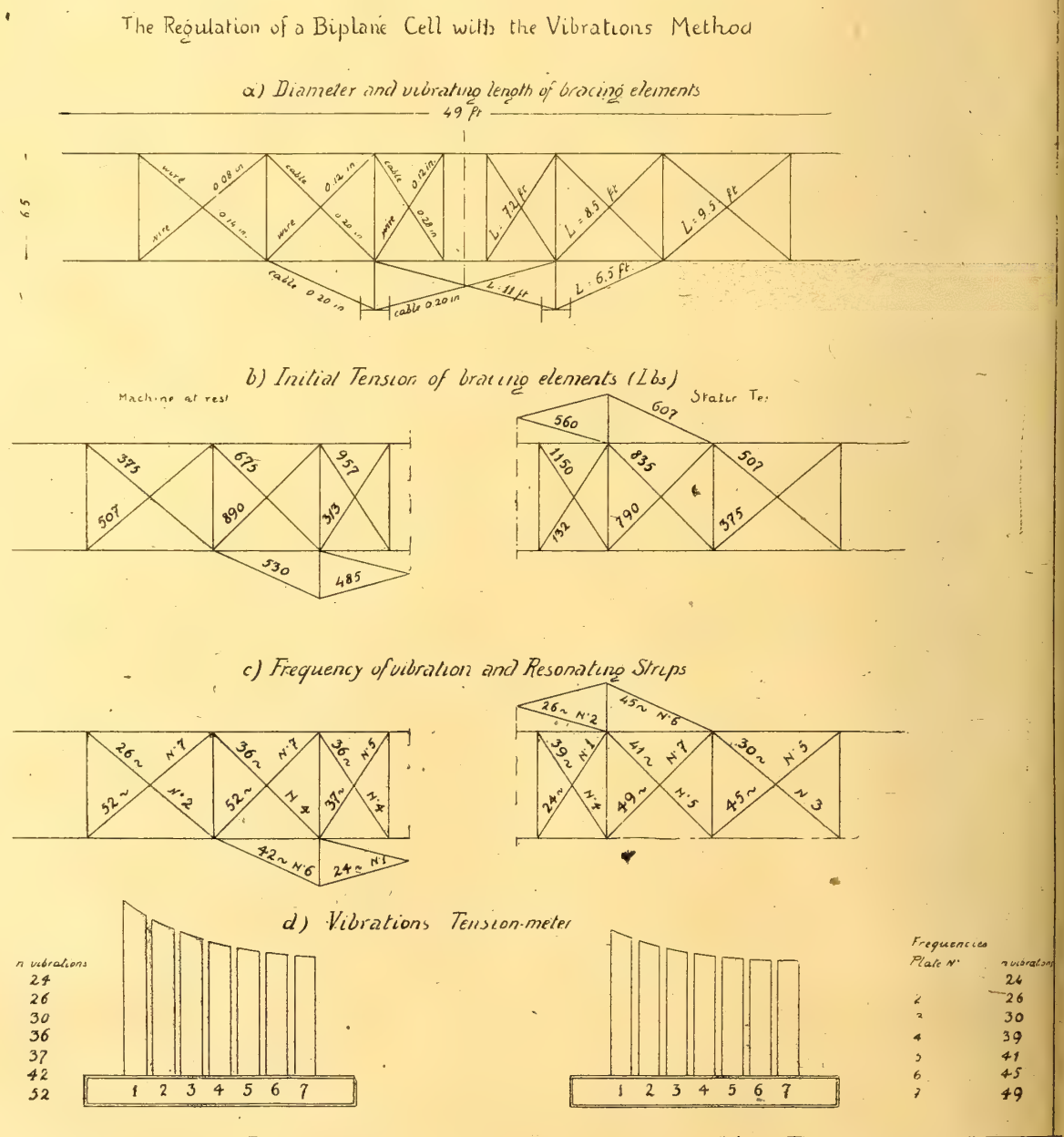
T = tension.
l = length of vibrating wire.
w = weight per unit of length.
g = acceleration of gravity.
n = frequency (vibrations per second).

Thus the tension is equal to Kn^2, K being a constant for any given cable or wire.

The frequency-meter, which acts really as a vibration tensionmeter, is made up of a series of small steel plates of various lengths are clamped at one extremity. (See Fig. (d) accompanying illustration.)

If one places the support of the meter in light contact with a wire which has been set in vibration, the plate, the natural period of which approaches that of the wire, will soon assume a distinct state of vibration.

If the instrument includes plates of frequencies from n to n^1 vibrations, n^1, being greater than 2n, resonance will occur simultaneously with two or three plates.







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This corresponds to the fact that a loaded wire can set in vibration plates whose periods of oscillation are n, 2n, 3n, etc., according to the frequencies of the harmonics of the vibrating wires.

In order to measure the tension one must consider only the fundamental vibration of lesser frequency n.

It was found that for the regulation (tuning-up) of all modern biplanes, including the most recent 1917 types, a series of plates comprising the frequencies from 25 to 50 per second is sufficient. All uncertainty due to multiple resonance is thus eliminated.

The error due to the presence of turnbuckles is about 3 per cent. in excess.

It was found also possible, in the course of destructive tests of new types of aeroplanes, to follow quickly the distribution of tensions in all the wires, and to determine irregularities which calculations did not predict.

The vibration tension meter allows, furthermore, to recognise all the elements (struts, cables and wires) which are capable of being influenced during flight by resonance with the motor, the fundamental frequency of which is of the order of 22-25 per second (1,300 to 1,500 revs. per minute).

A practical example will evidence better than any detailed description the proceeding for regulating a biplane cell with the new method.

The drawings show :—

(*a*) The framework of a 250 h.p. pusher biplane; the diameters of cables and wire and their "vibrating length," as measured between terminals.

(*b*) The tensions required in both cases for a machine at rest and one suspended for static test. Such tensions were determined, of course, with the view of allowing the best distribution of stresses under load.

(*c*) The frequencies of vibration of all the tension elements, determined either by means of the formula mentioned above, or employing a graphic diagram showing the relations existing between the variables T, n, l, w. The number of the meter plates whose frequencies are equal to that of the wires.

(*d*) The diagram of a seven-plate tension-meter for both cases.

To employ the vibrations' tension-meter, the wire must be free to vibrate between its terminal attachments.

After having set up the vibration, the meter support is placed in slight contact with one extremity of the vibrating strand. If the "resonating" plate is that corresponding to the tension required a further regulation is not needed.

Otherwise the resonance of a smaller plate (higher frequency) indicates excessive stress, while that of a greater one (lower frequency) indicates, on the contrary, lack of tension.

When the "tuning" of a strand is liable to influence the tension of another element the latter must be, if necessary, tuned a second time.

In the factories where this method is in use the tension-meter is accompanied merely by a simple diagram analogous to that (*c*) of the drawing.

The time required for the complete timing of a 200-300 h.p. modern biplane ranges from 10 to 20 minutes, according to the size and to the approximation of the primary regulation.

Turin, Sept. 10th, 1917.

A CLEVER CONTRIVANCE.

The ever increasing speed demanded by modern aircraft has necessitated the invention of some contrivance to prevent the streamline wire bracing chafing at the point where they come into contact, i.e., the knife-edge of the wire at the points of crossing.

This difficulty has been overcome in various temporary manners such as by binding the streamlines with flexible wire, or tying the wires with tape. Naturally this measure has only been temporary, and the vibration soon cuts such an elementary joint.

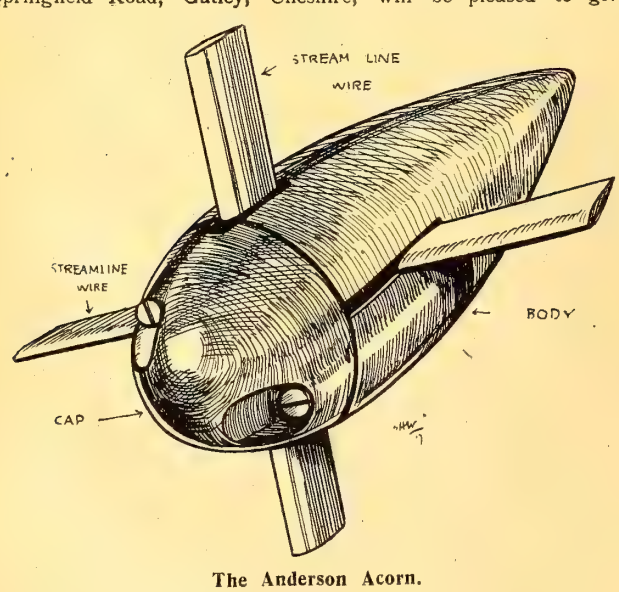
It has been left to the "Anderson Acorn" to solve this difficulty. This useful little accessory takes the form of a streamline-shaped cone, divided in two portions. This cone is slotted in order to take the streamline wires where they cross and the two halves of the cone are securely fastened. At the immediate joint where the streamline wires cross, a small insulation packing-piece has been inserted, and when the acorn is securely jointed together, the wires are thus locked tight and almost form one solid union, thus preventing vibration taking place at the point where it could do the most harm. It also locks the wires and prevents them turning out of line.

This acorn can be manufactured from any hardwood, i.e., walnut or mahogany, or can be made from red fibre or aluminium.

The minimisation of vibration in flying wires, therefore, can be solved by fitting of the "Anderson Acorn," and as the vibrating wire in flight causes about three times the head resistance of a wire that is rigid, the advantages that are to be gained by the fitting of this little appliance are easily seen.

The "Anderson Acorn" has an additional advantage, that of being commended by the Air Board as a very efficient device.

The joint inventor and patentee, Mr. A. L. Anderson, 6, Springfield Road, Gatley, Cheshire, will be pleased to give anyone interested further information. The Aircraft Supplies Co., Ltd., hopes to place the acorn on the market very shortly.



The Anderson Acorn.

AN INSPECTORS' TRADE UNION.

The following letter has been received for publication :—

"GOVERNMENT INSPECTORS."

SIR,—I wish to reach all readers of your journal who may at the present time be serving His Majesty as inspectors. Especially do I appeal to gentlemen of the Board of Trade, Lloyd's, Admiralty, Bureau Veritas, and the A.I.D. War Office to send me their endorsement of the great need to-day of a society which shall be helpful to their interests and prospects.

It is proposed to form a Society of Inspectors, and should there be a sufficiently strong backing from my colleagues throughout the country, a meeting will be notified where a Founders' Council will be formed.

It is hoped eventually that the proposed society will, by the gracious consent of His Majesty the King, be known as the "Royal Society of Inspectors."

The society's first purpose will be to see that membership will be valued as a treasured asset to any inspector, inasmuch that membership will only be attainable to those having a thorough knowledge of technical requirements of their duties.

The society will be constructive in all its objects, and will therefore be of great assistance to the Government. Gardeners will not be allowed to masquerade as shell experts, lawyers as steel inspectors, or hairdressers as aeroplane examiners.

Membership will not be granted to uniformed inspectors who have not previously seen actual fighting service, and unmarried inspectors of military age will not be accepted for membership until after the war. The need for urgency is very great indeed, as there are many serious disabilities now existent which the society would prevent, sorely endangering the success of our arms at home and abroad. (Signed) "ANON."

[Anyone wishing to communicate with the writer of the letter may do so by writing to "Anon," c/o THE AEROPLANE, 166, Piccadilly, W. All communications will be forwarded unopened, as this paper has no connection with the proposed society, and merely publishes the letter as a matter of courtesy.—ED.]

AIRCRAFT STEELS.

A catalogue issued by Messrs. Edgar Allen and Co., of Sheffield, gives particulars of nickel, nickel-chrome, chrome-vanadium, and other steels of their manufacture suitable for motor-car and aircraft purposes.

In the case of motor-cars there is a table showing which variety is adapted for use in the different parts of the engine, transmission, axles, and chassis and steering gear, and for some parts alternative recommendations are given, the use of one variety being advised when it is desired to have the best, as for racing or high-class touring cars, while another, or sometimes two, is suggested when cost is important.

For many of the steels details are given of their behaviour under tensile, torsion, and hardness tests, and also of the heat-treatment to which they should be subjected.

Another table summarises the physical characteristics of steels prepared in accordance with the specifications of the Engineering Standards Committee, the Air Board, etc., and shows the equivalence between these steels, which the company also make, and their own special products.

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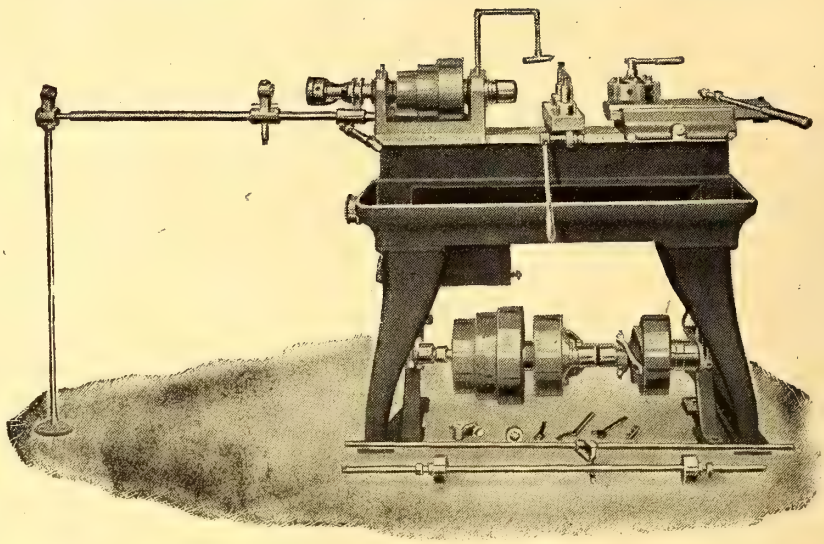
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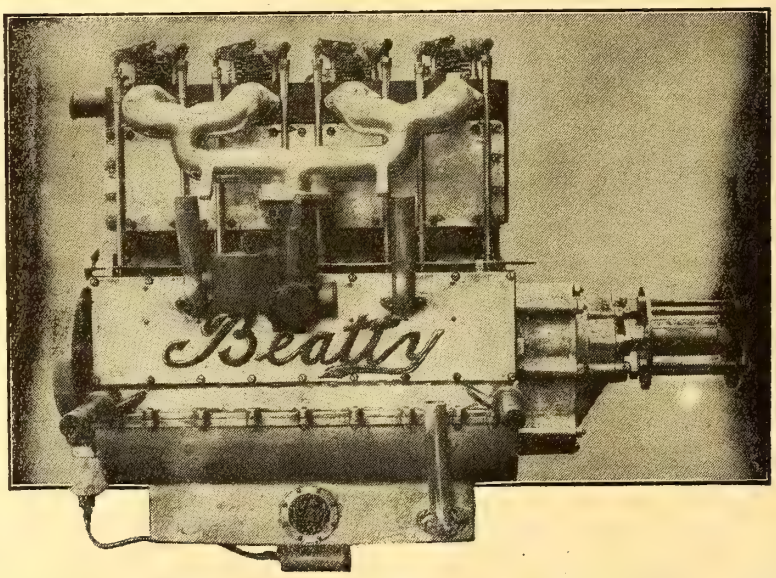
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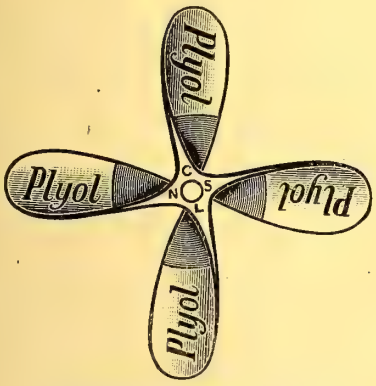
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Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6. Hampstead 4403 and 4404.
Davidson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1144-1145
Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1176.
Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 120.
Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophid, Crickle, London." Hampstead 7420.
Mann, Egerton & Co., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
Martinsyde, Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge." Woking 331; Byfleet 171.
National Aircraft Co., Ltd., 15, Hackney Road, N.E.2. London Wall 6725.
"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London." Willesden 2455.
Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48.
The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis, London." Putney 2240-2241.
Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester." City 8530-8531, Manchester.
Sage, Frederick & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes." Cowes 193.
Short Bros., Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London." Regent 378.
Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston." Kingston 744.
Standard Aircraft Manufacturing Co., Effingham House, Arundel Street, W.C.2. "Gunsignrush, Estrand, London." City 89.
Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickerfyta, Knights, London." Kensington 6810.
Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil" Yeovil 129.
White, J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes." Cowes 3.

Airships—

Airships, Ltd., High Street, Merton. Wimbledon 1314.
Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, 'Phone London." Regent 378.

Aluminium Castings—

Coan, R. W., 219, Goswell Road, London, E.C.1 "Krankases, Isling, London." City 3846.

Bearings (Etonia Cast Phosphor Bronze)—

Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3927.

Brass Sheets for Tipping Propellers—

Lucraft, H., & Co., 147, Fenchurch Street, London, E.C.3. "Lucraftia, London." Avenue 2217.
Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 995, 996, and 7006.

Buildings—

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation Norwich." Norwich 851.
Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313
Rubery Owen & Co., Darlaston. South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
The Wilfley Co., Ltd., Salisbury House, London Wall, E.C.2. "Wrathless, Phone, London." City 2681-2

Cable Coverings and Cable Controls—

Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Capstan Work—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Carburettors—

Hobson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1. Victoria 4070.

Casein—

Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3. "Suric don, London." Avenue 34 and 35.

Castings—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Lucraft, H., & Co., 147, Fenchurch Street, London, E.C.3. "Lucraftia, London." Avenue 2217.

Castings (Aluminium, Brass, Bronze, Machined or Rough)—

Coan, R. W., 219, Goswell Road, London, E.C.1. "Krankases, Isling, London." City 3846.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Celluloid (Non-Flam.)—

Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7.
London Label Co., Beckton Road, E.16. "Lonlabel, Canning, London." East 1300.

Clothing—

Burberry's, Ltd., Haymarket, S.W.1. Regent 2165.
Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6.
Hazel & Co., 4, Princes Street, Hanover Square, W.1. Mayfair 4071-2.
Robinson & Cleaver, Ltd., Regent Street, London, W.1. Gerrard 1070.

Component Parts—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (4 lines).
B. D. V. Aircraft Spares, Syon Chambers, 163, Kew Road, Richmond, Surrey. "Aeros, Richmond." Richmond 1681.
Central Aircraft Co., Palmerston Works, High Rd., Kilburn, N.W.6. Hampstead, 4728.
The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aercracons, Canning, London." East 1300.
The Osborne Aircraft Co., Ltd., Whin Hill, Greenock, Scotland. "Cordage, Greenock." Greenock 618.

Cords, Tapes, and Threads—

MacLennan, J., & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.

Dopes—

British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312.
British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellutate, London." Regent 4046.
Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawb, London." London Wall 5350-3622.
Clark, Robert, Ingham & Co., Ltd., Caxton House, S.W.1. "Pearline, Vic, London." Victoria 2923.

Electrical Accessories—

Johnson & Phillips, Ltd, Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 1564.
Mann, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston road, London." Museum 70.
Premier Electric Heaters, Ltd., 258, 259, and 360, Bradford Street, Birmingham. "Fahrenheit, Birmingham." Midland 981.

Electric Cables—

E. Kalker & Co., Coventry. "Kalker, Coventry." Coventry 24x.
Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 1564.

Electric Lighting and Power—

E. Stanley Fardon, A.M.I.E.E., 67, Mosley Street, Manchester.
Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 1564.

Engines and Parts—

Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford. "Pump, Bedford." Bedford No. 1.
Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.
The Beatty School of Flying, Ltd., The Broadway, Cricklewood, N.W.2. Hampstead 3000.
Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London." Gerrard 238.
Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London S.W.1. "Aeroflight, Vic, London." Vic 7026.
Gordon Watney & Co., Ltd., Weybridge. "Mercedes, Weybridge." Weybridge 550 (7 lines).
Green Engine Co., Ltd., Twickenham. Richmond 1203.

Engines and Parts (*continued*)—

Gwynnes, Ltd., Hammersmith Iron Works, Hammersmith, W. "Gwynne, Hammersmith." Hammersmith
Napier & Son, D., Ltd., 14, New Burlington, London, W., and at Acton, W. "Napier, London" Gerrard
Rolls-Royce, Ltd., 14 and 15, Conduit St., "Rolhead, London." Gerrard 16
The Selsdon Aero & Engineering Co., Imperial House, Kingsway, W.C.2. Regent
Sturtevant, B. F., Co., Ltd., Hyde Park, U.S.A.
Sunbeam Motor Car Co., Ltd., Wolverhampton. "Moorfield, Wolverhampton." Wolverhampton
The Gnôme & Le Rhône Engine Co., 47, Victoria Street, S.W. "Eleven, London." Walthamstow 408 (2

Flare Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3

Flexible Shafts—

Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch

Flying Schools—

Bournemouth Aviation Co., Ltd., Talbot Village, Bournemouth. "Etches, Winton Bournemouth

Furniture (Office)—

Cooke's (Finsbury), Ltd., Finsbury Pavement House, London, E.C.2. London Wall 573 and

Galvanising—

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich
Cowper-Coles Manufacturing Co., Sunbury-on-Thames. Sunbury

Gears—

Moss Gear Co., Ltd., Thomas Street, Birmingham. "Mosgear, Birmingham

Glue—

Improved Liquid Glues Co., Ltd., Gotage Street, E. (Croid.). "Exc Wapp, London." Avenue
Mendine Co., 8, Arthur Street, E.C. Ban

Goggles—

Triplex Safety Glass Co., Ltd., 1, Alt Street, Piccadilly, W.1. "Shatterlys, London." Regent

Heating and Ventilating—

Chas. P. Kinnell & Co., Ltd., 65, Southwark Street, London, S.E.1. "London." Hop 372 (2

Instruments—

British Wright Co., Ltd., 33, Chancery W.C.2. Holborn

Instruments (Scientific, meters, etc.)—

The Cambridge Scientific Instrument Co Cambridge. "Instrument, Cambridge" Cambrid
Short & Mason, Ltd., Macdonald Walthamstow, E.17. "Aneroid, London." Walthamstow

Machine Tools—

Brewster & Co., 11, Queen Victoria E.C.4. "Circumfuse, Cannon, Lon C

Magneto Driving Pieces—

Herbert Terry & Sons, Ltd., R "Springs, Redditch." Redd

Magnetos—

The M-L Magneto Syndicate, Ltd., Works, Coventry. "Corlton, Coven Coventry 1
The British Lighting & Ignition Co. 204, Tottenham Court Road, W.1. mag, Phone London." Muse

Metal Manufacturers—

Clifford, Chas., & Sons, Ltd., Birm "Clifford, Birmingham." Centra

Metals in General—

Samuel Mercer & Co., 198, Upper Street, E.C.4. "Reconciled, Cann don." C
Pritt & Co., 46, Fenchurch Street, E.C.3. "Poetry, Fen, London." Avenue 995, 996, a

Metal Parts and Fittings—

Accles & Pollock, Ltd., Oldbury, Birm "Accles, Oldbury." Oldbury 111
Aircraft Supplies Co., Ltd., Ascol Hou Long Acre, W.C.2. "Upcast, London." Gerrard 276
Arnott & Harrison, Ltd., Hythe Road, den Junction. Willesd
Bayliss, Jones & Bayliss, Ltd., Wolverh (Bolts and Nuts.) "Bayliss, Wolv ton." Wolverhampt
The Birmingham Guild, Ltd., 45, Gt. Street, Birmingham. "Handicraft Cent
Blackburn Aeroplane & Motor Co Olympia, Leeds. "Propellors, Lee Roundhay 345
The British Gold Shell Ring Co., Ltd ness Road, Hounslow, London. Hounslow." Houns

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tal Parts and Fittings (*contd.*)—

British Metal (Kingston), Ltd., Kingston-on-Thames.
Iann, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston road, London." Museum 70.
Mountford, Fredk., Ltd., Fremo Works, Lifford, Birmingham "Fremo, Birmingham." Kings Norton 261.
Rubery, Owen, & Co., Ltd., Darlaston. "Roofs, Darlaston." Darlaston 87.
Sankey, Joseph, & Sons, Ltd., Wellington, Shropshire. "Sankey, Wellington, Salop." Wellington 66.
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.
The Aircraft Construction Co., Harlev Works, Beckton Road, E.16. "Aercracons, Canning, London" East 1300.
Thompson Bros., Ltd., Bradley, Bilston. "Thompson Bros., Bilston." Bilston 10.
Cooler Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10.

tal Shearing Tools—

Montgomery, Smith, & Co., Ltd., Tangent Works, Keynsham, near Bristol. "Ingenuity, Saltford." Keynsham 21.

tal Spinnings—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

ric Bolts—

Ashmore Bros., Zota Works, Hildreth Street, Balham, S.W. Battersea 415.
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

cellaneous—

Anderson, D., & Son, Ltd (Roofs), Belfast. "Anderson, Belfast." Belfast 4033-4034-4035.
Anti-Glare Glass Co., Ltd., 76, Turnmill Street, E.C. Central 3731.
Bowden Wire, Ltd., Willesden Junction, "Bowirelim, Harles, London." Willesden 2400 (3 lines).
British Metal (Kingston), Ltd., Kingston-on-Thames.
Brown Bros., Ltd., Great Eastern Street, E.C.1. "Imbrowned, Bethroad, London." London Wall 6300.
Calolithic Manufacturing Co., Ltd., 61½, Fore Street, London, E.C.2. Labels in Metal, Ivory, Ivorine, etc.
Herbert Frood Co., Ltd., Chapel-en-le-Frith. "Frodobrake, Birmingham." Central 793.
Jasso Manufacturing Co., Ltd., 211, City Road, E.C. City 9558.
London Label Co., Ltd., Harley Works, Beckton Road E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.
MacLennan, J., & Co., 30, Newgate Street, E.C.1., and at Glasgow. Tapes, Cords and Threads. City 3115.

tor Cars—

Maxwell Johnston, Ltd, Dumfries. "Mocar, Dumfries." Dumfries 281-282.
Mann, Egerton & Co., Ltd., 379/381, Euston Road, London, N.W.1. "Manegecar, Euston road, London." Museum 70.
Standard Motor Car Co., Coventry. "Flywheel, Coventry." Coventry 530 (4 lines).

neplates and Labels—

British Metal (Kingston), Ltd., Kingston-on-Thames.
Calolithic Manufacturing Co., Ltd., 61½, Fore Street, London, E.C.2.
The Clegg Metal Engraving Co., Chatsworth Works, Worthing. "Clegg Worthing."

servation Panels—

Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

achutes—

R. Calthrop's Aerial Patents, Ltd., Eldon Street House, Eldon Street, London, E.C. "Savemalivo, Ave, London." London Wall 3266-3267.

ent Agents—

King's Patent Agency, 165, Queen Victoria Street, E.C.4. Central 682.
Page & Rowlingson, 27, Chancery Lane, E.C.4. Central 332.
Stanley Popplewell & Co., 38, Chancery Lane, W.C.2. Central 1763.

tern Making—

Fredk. Ward, 6, 7 and 8, Allsop Street, Upper Baker Street, W. Padd 4743.

rol Storage (Bulk)—

Aywater & Co. (The Hydraulic System), Craven House, Kingsway, London, W.C.2. "Bywaterist. London." Gerrard 2220.

ton Rings—

British Chuck & Piston Ring Co., Coventry. "Rings, Coventry." Coventry 723.

ver Presses and Dies—

Bliss, E. W., & Co., 2a, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon, London." Hop 4340.

sswork—

Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds:" Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851
Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.
Integral Propeller Co., Ltd. "Aviprop, Hyde, London." Hendon 9. Kingsbury 104.
Lang Propeller, Ltd., Weybridge. "Aerosticks, Weybridge." Weybridge 520-521.
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich" Norwich 482 (4 lines).
Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 291, Leeds.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

Rigging for Aircraft—

Cradock, G., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466. Enfield 520 (6 lines).

Rubber Tubing & Accessories—

Hancock James Lyn, Ltd., 266, Goswell Rd., London, E.C.1. "Masticator, Isling, London." City 3811 and 3812.

Safety Belts—

Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.

Sand and Die Castings—

Coan, R. W., 219, Goswell Road, London, E.C. "Krankases, Isling, London." City 3846.

Scientific Instruments—

The Foster Instrument Co., Letchworth, Herts. "Instrument, Leeds." Chapeltown 474.

Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay, 345 (3 lines).
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.
Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton." Southampton 1337.

Searchlights and Landing Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Seats for Aeroplanes—

Bowser, E., Art Cane Works, 50 Park Lane, Leeds. Central 3437.

Shackles—

The British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow. "Golshel, Hounslow." Hounslow 254.

Sheet Metal Pressings—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.
W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk, Bham." Central 550.
British Metal (Kingston), Ltd., Kingston-on-Thames.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 407 Birmingham.
Nicholls & Lewis, Ltd., 16, Princep Street, Birmingham. "Colpressed, Birmingham." Central 7188.
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

Sheet Metal Work— Thames.

British Metal (Kingston), Ltd., Kingston-on-
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.

Shock Absorbers (Elastic Cord)—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.

Sparking Plugs—

Forward Motor Co., Summer Row, Birmingham. Central 6259.
Hobson Manufacturing Co., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.
Lodge Sparking Plug Co., Ltd., Rugby. "Igniter, Rugby." Rugby 235.
Ripault, Leo, & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758.

Springs—

Dart Spring Co., West Bromwich. "Dart, West Bromwich." West Bromwich 322
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Steel—

Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237.
Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham." Smithwick 224.

Steel Tension Wires—

Cradock, G., & Co., Ltd., Wakefield. "Cradock, Wakefield." Wakefield 466 (3 lines).

Steel Tubes for Aeroplanes—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Taper Pins—

Mountford, Fredk. (Birmingham), Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262

Tapes and Smallwares—

MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow City 3115.
James North Hardy & Son, Ltd., 54, Portland Street, Manchester "Hardson, Manchester." Central 6471.

Timber—

Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Entikosil, Vic, London." Victoria 5073, 4210.
Brown, R. F., & F. W., Wollaton Saw Mills, near Nottingham. "Brown's Saw Mills, Wollaton." Nottingham 1526.
J. Owen & Sons, Ltd., 199a, Borough High Street, S.E.1. "Bucheron, London."

Time Recorders— Hop 3811 (2 lines).

Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310

Turnbuckles—

Rubery Owen & Co., Darlaston, South Staffs "Roofs, Darlaston." Darlaston 87 (3 lines)

Tyres and Wheels—

The Palmer Tyre, Ltd., Shaftesbury Avenue "Tyricord, Westcent." Gerrard 1214 (4 lines)

Varnishes—

Clark, R. Ingham, & Co., Caxton House, S.W.1. "Pearline, Vic, London Victoria 2023
Harland, W., & Son, Merton, London, S.W.19. "Harland, Wimbledon 45." Wimbledon 45 and 1395
Naylor Bros., Ltd., Southall, Middlesex "Naylor, Southall." Southall 30.

Washers—

Herbert Terry & Sons, Ltd. Redditch. "Springs, Redditch." Redditch 61.

Watchmakers and Jewellers (Silver Models)—

Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 6001 (3 lines).

Welding and Cutting Plant—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Welding Repairs—

Barimar, Ltd., 10, Poland Street, W.1. "Barimar, Reg, London" Gerrard 8173
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London."

Wind Shields— 3540 Victoria (3 lines).

Auster, Ltd., 133, Long Acre, W.C "Windflector, London." Regent 5910.
London Label Co., Ltd., Hadley Works, Beckton Road, E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1 "Shatterlys, Piccy, London." Regent 1340.

Wire Gauze—

N. Greening & Son, Ltd., 16, Finsbury Street, London, E.C. "Setscrew, Finsquare, London." London Wall 1082.

Wires and Cables (Aeroplanes)—

Bruntons, Musselburgh, Scotland. "Wiremill, Musselburgh." Musselburgh 28.
Cradock, Geo., & Co., Ltd., Wakefield. "Cradock, Wakefield." Wakefield 466 (3 lines).

Wirework—

Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Woodworking Machinery—

Robinson, Thomas, & Son, Ltd., Railway Works, Rochdale. "Robinson, Rochdale." Rochdale 467.
Sagar, J., & Co., Ltd., Halifax. "Sawtooth, Halifax." Halifax 136.
Wadkin & Co., Leicester. "Woodworker, Leicester." Leicester 3614.

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Acetylene Welding Plant—

Acetylene Corporation of Great Britain, Ltd., Acetylene Corporation of Great Britain, Ltd., The, 36, Victoria Street, Westminster, S.W.1. "Flammia, Vic, London." Vic 3830.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, Phone, London." don, S.W.1. 3549 Victoria (3 lines).

Aeroplane Manufacturers—

Aircraft Manufacturing Co., Ltd., Hendon. "Airmanship, Hyde, London." Kingsbury 180.
Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne." Gosforth 500.
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.
British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol." Bristol 3906.
British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudronian, Crickle, London." Hampstead 5554.
Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6. Hampstead 4303 and 4304.
Davidson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1744-1745
Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1176.
Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 120.
Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydroplid, Crickle, London." Hampstead 7420.
Mann, Egerton & Co., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
Martinsyde, Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge." Woking 331; Byfleet 171.
National Aircraft Co., Ltd., 15, Hackney Road, N.E.2. London Wall 6725.
"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London." Willesden 2455.
Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48.
The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis, London." Putney 2222-2231.
Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester." City 8530-8531, Manchester.
Sage, Frederick & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes." Cowes 193.
Short Bros., Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London." Regent 378.
Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston." Kingston 744.
Standard Aircraft Manufacturing Co., Effingham House, Arundel Street, W.C.2. "Gunsigrarush, Estrand, London." City 80.
Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickersfute, Knights, London." Kensington 6800.
Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.
White J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes." Cowes 3

Airships—

Airships, Ltd., High Street, Merton Wimbledon 1314
Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, Phone, London," Regent 378.

Aluminium Castings—

Coan, R. W., 219, Goswell Road, London, E.C.1. "Krankases, Isling, London." City 3846.

Bearings (Etonia Cast Phosphor Bronze)—

Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3927.

Brass Sheets for Tipping Propellers—

Lucraft, H., & Co., 147, Fenchurch Street, London, E.C.3. "Lucraftia, London." Avenue 2217.
Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 995, 996, and 7006.

Buildings—

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation Norwich." Norwich 851.
Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313
Ruberv Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
The Withy Co., Ltd., Salisbury House, London Wall, E.C.2. "Wraithless, Phone, London." City 2681-2

Cable Coverings and Cable Controls—

Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Capstan Work—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Carburettors—

Hobson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.

Casein—

Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3. "Surie, London." Avenue 34 and 35.

Castings—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Lucraft, H., & Co., 147, Fenchurch Street, London, E.C.3. "Lucraftia, London." Avenue 2217.

Castings (Aluminium, Brass, Bronze, Machined or Rough)—

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Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Celluloid (Non-Flam.)—

Greenhill & Sons, 8, Water Lane, E.C. "Greenhill, London." Central 1306-7.
London Label Co., Beckton Road, E.16. "London Label, Canning, London." East 1300.

Clothing—

Burberry's, Ltd., Haymarket, S.W.1. Regent 2165.
Dunhill's, Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6.
Hazel & Co., 4, Princes Street, Hanover Square, W.1. Mayfair 4071-2.
Robinson & Cleaver, Ltd., Regent Street, London. Gerrard 1070.

Component Parts—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (4 lines).
B. D. V. Aircraft Spares, Syon Chambers, 161, Kew Road, Richmond, Surrey. "Aeros, Richmond." Richmond 1681.
Central Aircraft Co., Palmerston Works, High Rd., Kilburn, N.W.6. Hampstead, 4728.
The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aerocanons, Canning, London." East 1300.
The Osborne Aircraft Co., Ltd., Whin Hill, Greenock, Scotland. "Cordage, Greenock." Greenock 618.

Cords, Tapes, and Threads—

MacLennan, J., & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.

Dopes—

British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312.
British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellutate, London." Regent 4046.
Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawb, London." London Wall 5330-3622.
Clark, Robert, Ingham & Co., Ltd., Caxton House, S.W.1. "Pearline, Vic, London." Victoria 2023.

Electrical Accessories—

Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 1564.
Mann, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Eustoad, London." Museum 70.
Premier Electric Heaters, Ltd., 238, 239, and 360, Bradford Street, Birmingham. "Fahrenheit, Birmingham." Midland 981.

Electric Cables—

E. Kalker & Co., Coventry. "Kalker, Coventry." Coventry 248.
Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 1564.

Electric Lighting and Power—

E. Stanley Fardon, A.M.I.E.E., 67, Mosley Street, Manchester.
Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 1564.

Engines and Parts—

Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford. "Pump, Bedford." Bedford No. 1.
Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.
The Beatty School of Flying, Ltd., The Broadway, Cricklewood, N.W.2. Hampstead 3000.
Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London." Gerrard 738.
Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London, S.W.1. "Aeroflight, Vic, London." Vic 7026.
Gordon Watney & Co., Ltd., Weybridge. "Mercedes, Weybridge." Weybridge 550 (7 lines).
Green Engine Co., Ltd., Twickenham. Richmond 1202.

Engines and Parts (continued)—

Gwynnes, Ltd., Hammersmith Iron Works, Hammersmith, W. "Gwynnes, Hammersmith."
Napier & Son, D., Ltd., 14 New Bartlett Street, London, W., and at Acton, W. "Napier, London."
Rolls-Royce, Ltd., 14 and 15, Conduit Street, London, W. "Rolls-Royce, London."
The Sclsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.
Sturtevant, B. F., Co., Ltd., Hyde Park, London, U.S.A.
Sunbeam Motor Car Co., Ltd., Wolverhampton. "Moorfield, Wolverhampton."
The Gnôme & Le Rhône Engine Co., Ltd., 47, Victoria Street, S.W. "Gnôme, London." Walthamstow 468 (3 lines).

Flare Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, Phone, London." 3549 Victoria (3 lines).

Flexible Shafts—

Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Flying Schools—

Bournemouth Aviation Co., Ltd., Talbot Village, Bournemouth. "Etches, Winton, Bournemouth."

Furniture (Office)—

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Cowper-Coles Manufacturing Co., Ltd., Chemical Works, Cheshunt.

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Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlis, Piccy, London." Regent 1340.

Heating and Ventilating—

Chas. P. Kinnell & Co., Ltd., 65 & 72, Southwark Street, London, S.E.1. "Kinnell, London." Hop 372 (6 lines).

Instruments—

British Wright Co., Ltd., 33, Chancery Lane, W.C.2. Holborn 6

Instruments (Scientific, Measuring, etc.)—

The Cambridge Scientific Instrument Co., Ltd., Cambridge. "Instrument, Cambridge." Cambridge 423.
Short & Mason, Ltd., Walthamstow, E.17. "Stampel, Phone, London." Walthamstow 1

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Hobson, Chas., & Co., Ltd., Darlaston. "Roofs, Darlaston." Darlaston 87.
Hudson & Sons, Ltd., Wellington, Salop. "Sankey, Wellington, Salop." Wellington 66.
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Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

Rigging for Aircraft—

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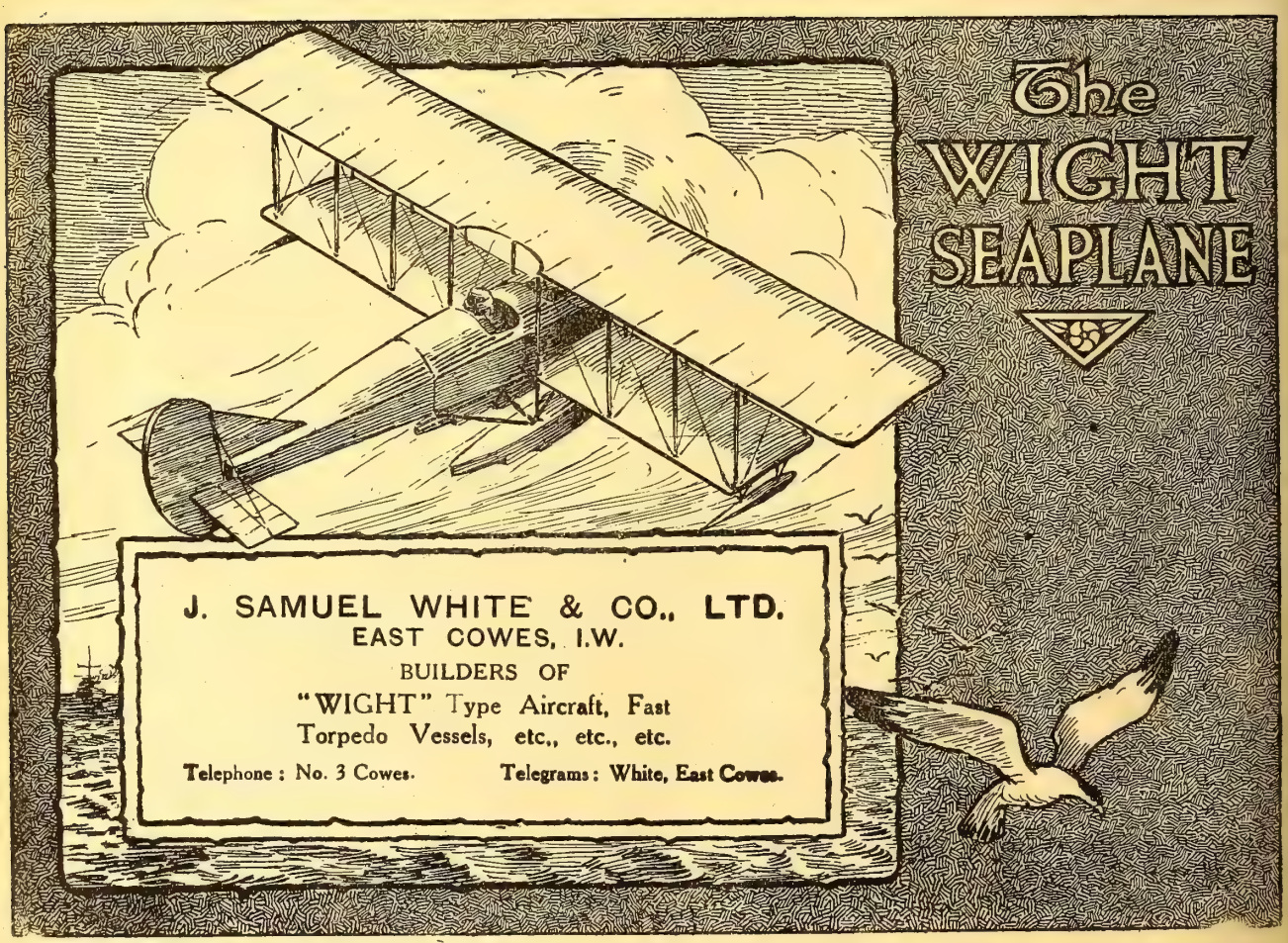
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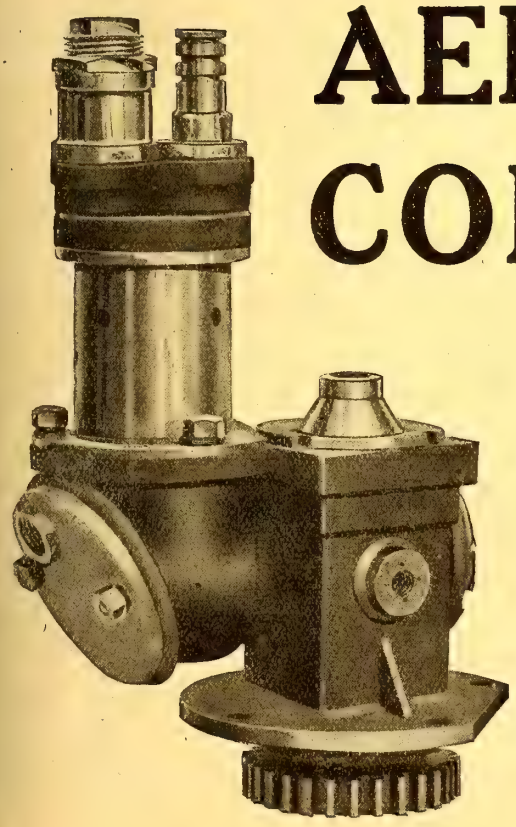
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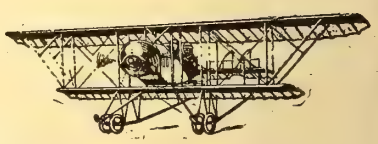
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American Wire and Cable Standards.

The following extracts from the report of the U.S. Advisory Committee for Aeroplane Material, Specifications and Inspection were recommended for standardisation at the Washington meeting of the Society of Automotive Engineers.

Aircraft Round Wire.

This specification covers solid high strength steel wire, round section, used in the construction of aircraft when flexibility is of minor importance. A tension test is to be made on each piece or coil of wire. When an individual coil of wire is to be divided into smaller coils to meet special requirements it is sufficient to make one test on the original coil and to cut and seal the smaller coils in the presence of the inspector. Samples for tension test shall be no less than 15 in. long and free from bends and kinks.

Table of Physical Properties for Aircraft Round Wire.

Brown & Sharpe Gauge.	Diameter inches.	Minimum Torsion for 6 inch.	Weight in lbs. per 100 feet.	Number of Bends through 90 deg.	Breaking Strength Minimum lbs.
6	0.162	11	7.01	5	4,500
7	0.144	12	7.01	6	3,700
8	0.128	14	4.40	8	3,000
9	0.114	16	3.50	9	2,500
10	0.102	18	2.77	11	2,000
11	0.090	21	2.20	14	1,620
12	0.081	24	1.744	17	1,300
13	0.072	27	1.383	21	1,040
14	0.064	31	1.097	25	830
15	0.057	34	0.870	29	660
16	0.051	39	0.690	34	540
17	0.045	44	0.547	42	425
18	0.040	49	0.434	52	340
19	0.036	55	0.344	70	280
20	0.032	61	0.273	85	225
21	0·028	70	0.216	105	175

In making tensile tests on aircraft wire the distance between jaws of testing machine with sample in place and before test shall be 10 in. Wire for this purpose must break at no less than the amount specified in the attached table which herewith becomes a part of this specification.

A torsion test is to be made on a sample cut from each piece or coil of wire as above. Samples for torsion tests shall be straight and no less than 10 in. long. The sample shall be gripped by two vices 6 in. apart; one vice shall be turned uniformly at a speed not exceeding 60 r.p.m. (on the larger sizes of wire this speed shall be reduced sufficiently to avoid undue heating of the wire). One vice shall have free axial movement in either direction. All wire shall be required to stand the minimum number of complete turns shown in the first table.

A bend test is to be made on a sample cut from each piece of wire as above. Sample for bend test shall be straight and no less than 10 in. long. One end of the sample shall be clamped between jaws having their upper edges rounded to 3/16 in. radius. The free end of the wire shall be held loosely between two guides and bend 90 deg. over one jaw; this is to be counted as one bend. On raising to a vertical position the count will be two bends. Wire shall then be bent to the other side, and so forth, alternating to fracture. The minimum number of bends required is stated in the table.

Aircraft Galvanised Single Strand Cable (Non-flexible).

Diameter of Cable, inches.	Number of Wires.	Breaking Strength of Cable, lb.	Approximate Weight lb. per 100 ft.
5/16	19	12,500	20.65
1/4	19	8,000	13.50
7/16	19	6,100	10.00
3/16	19	4,600	7.70
5/32	19	3,200	5.50
1/8	19	2,100	3.50
7/64	19	1,600	2.60
3/32	19	1,100	1.75
5/64	19	780	1.21
1/16	19	500	0.78
1/32	7	185	0.30

A wrapping test is to be made on at least 10 per cent. of the total number of coils offered for inspection at one time. The wire shall be tightly wrapped eight consecutive turns around its own diameter with a pitch of substantially the diameter of the wire and then unwrapped maintaining the free end at approximately 90 deg. with the mandril.

Aircraft Galvanised Multiple Cable *6x7 Cotton Centre (Flexible).

Diameter of Cable, inches	Breaking Strength of Cable, lb.	Approximate Weight lb. per 100 feet.
5/16	7,900	15.00
1/4	5,000	9.50
7/32	4,000	7.43
3/16	2,750	5.30
5/32	2,200	4.20
1/8	1,150	2.20
7/64	830	1.50
3/32	780	1.30
5/64	480	0.83
1/16	400	0.73

*Six strands of seven wires each.

It must stand this test without fracture. Because of the possibility of personal error in making this test, failure on one test is not considered conclusive and, if requested to do so, the inspector shall make at least one, but no more than two additional tests on the same piece of wire. If any of these tests are successful the material shall be passed as satisfactory in this respect.

All wire for this purpose shall be furnished in decimal sizes corresponding to the American Standard Wire Gauge (Brown

Reels for Aircraft Strand and Cable.*

Diameter of Strand or Cable.	1000 feet. Diam. Head.	Traverse or Distance between Heads.	Diam. Bbl.	Diam. Arbor Hole.	3000 feet. Diam. Head.	Traverse or Distance between Heads.	Diam. Bbl.	Diameter Arbor Hole.
1/32	12	4	8	1 1/8	12	4	8	1 1/8
1/16	12	4	8	1 1/8	12	4	8	1 1/8
5/64	12	4	8	1 1/8	16	4	10	1 1/8
3/32	12	4	8	1 1/8	16	4	10	1 1/8
7/64	16	4	10	1 1/8	16	7	12	1 1/8
1/8	16	4	10	1 1/8	16	7	12	1 1/8
9/64	16	7	12	1 1/8	16	10	8	1 1/8
5/32	16	7	12	1 1/8	16	10	8	1 1/8
3/16	18	7	12	2 1/8	18	10	8	2 1/8
7/32	18	7	12	2 1/8	18	10	8	2 1/8
1/4	18	10	10	2 1/8	24	10	10	2 1/8
5/16	18	10	10	2 1/8	24	10	10	2 1/8
11/32	18	10	8	2 1/8	32	16	16	2 1/8
3/8	18	10	8	2 1/8	32	16	16	2 1/8
	5000 feet.				10000 feet.			
1/32	12	4	8	1 1/8	16	4	10	1 1/8
1/16	16	4	10	1 1/8	16	4	12	1 1/8
5/64	16	7	12	1 1/8	16	10	8	1 1/8
3/32	16	7	12	1 1/8	16	10	8	1 1/8
7/64	16	10	8	1 1/8	18	10	8	1 1/8
1/8	16	10	8	1 1/8	24	10	10	1 1/8
9/64	24	10	10	1 1/8	24	16	10	2 1/8
5/32	24	10	10	1 1/8	24	16	10	2 1/8
3/16	24	10	10	2 1/8	24	16	10	2 1/8
7/32	24	10	10	2 1/8	32	20	16	3 1/8
1/4	32	18	16	2 1/8	36	22	18	3 1/8
5/16	32	18	16	2 1/8	36	22	18	3 1/8
11/32	32	20	16	3 1/8	50	16	26	3 3/8
3/8	32	20	16	3 1/8	50	16	26	3 3/8

In making racks for the above reels allow 4 inches more width than the traverse specified above. *All dimensions in inches.

and Sharpe Gauge). The wire shall be cylindrical and smooth and show no evidence of scapes, splints, cold shuts and rough tinning, not conforming with best commercial practice. A permissible variation of 0.002 in. above gauge on all sizes will be acceptable, but no wire will be accepted having a variation of more than 0.0005 in. below gauge.

AIRCRAFT GALVANISED MULTIPLE CABLE *7x7 WIRE CENTRE (Flexible).

Diameter of Cable, inches.	Breaking Strength of Cable, lb.	Approximate Weight lb. per 100 feet.
5/16	9,200	16.70
1/4	5,800	10.50
7/32	4,600	8.30
3/16	3,200	5.80
5/32	2,600	4.67
1/8	1,350	2.45
7/64	970	1.75
3/32	920	1.45
5/64	550	0.93
1/16	480	0.81

*Seven strands of seven wires each.

SINGLE STRAND, MULTIPLE STRAND 6x7, 7x7, AND 7x19.

A tensile test shall be made upon each individual reel of cable for shipment containing 10,000 ft. or more. On shipments of reels of cable containing less than 10,000 ft., each test shall be made for each 5,000 ft. of a size. The tension testing machine shall be of a type satisfactory to the representative of the U.S. Government and shall be standardised with U.S. Standard Weights when considered necessary. Samples of cable for testing for tensile strength shall be no less than 24 in. long. In making tensile tests the distance between jaws of testing machine with sample in place and before test shall be no less than 10 in. Samples for tensile test may be clamped in the jaws of the testing machine in the usual manner to facilitate speed of testing, but in case of failure or dispute on individual tests and at the request of the manufacturer, check tests shall be made by socketing the samples with pure zinc. Cables for use in the construction of aircraft must break at no less than the amount specified in the attached table.

AIRCRAFT TINNED MULTIPLE STRAND CABLE *7x19 WIRE CENTRE (Extra Flexible).

Diameter of Cable, inches,	Breaking Strength of Cable, lb.	Approximate Weight lb. per 100 feet.
3/8	14.400	26.45
11/32	12,500	22.53
5/16	9,800	17.71
9/32	8,000	14.56
1/4	7,000	12.00
7/32	5,600	9.50
3/16	4,200	6.47
5/32	2,800	4.44
1/8	2,000	2.88

*Seven strands of nineteen wires each.

At least one bending test is to be made on a sample cut from each 50,000 ft. of cable of a given size. Each sample must be bent once around its own diameter and straightened again at least 20 times in succession in the same direction of bending without any of the wires breaking.

A torsion test is to be made on one wire from each sample of cable taken for tensile test. The wire is to be gripped by two vices 4 in. apart; one vice shall be turned uniformly at as high a rate of speed as possible without perceptibly heating the wire. One vice shall have free axial movement in either direction. The number, N, of whole turns through which the wire must stand twisting is given by the formula:—

$$N = \frac{1.1}{d}$$

where d equals the diameter of the wire in inches. Failure of one piece of wire to show full number of turns specified in the above torsion test shall not be considered cause for rejection, but in each case two additional tests shall be made on two more wires from the same sample of cable and if both samples meet the requirements of the specifications the strand shall be accepted in this respect.

No variation is permissible below nominal diameter. Cable having a diameter of 1/32 to 5/32 in. inclusive shall have a permissible variation of 10 per cent. above size and cable having a diameter of 3/16 to 3/8 in. inclusive shall have a permissible variation of 7 per cent. above size.

PROTECTIVE COATINGS FOR METALS.

The Aeronautical Division of the Standards Committee of the S.A.E. is now engaged in a study of the various kinds of anti-rust treatment of metals. This subject is exceedingly important at present, on account of the need for protecting many of the bolts, nuts and fittings used on aircraft from the action of the elements. It is planned to secure as many samples as possible of treatments, making use of chemical or heat methods or a combination of the two, for protecting metals.

THE FABRIC QUESION.

On Oct. 30th, **Mr. Churchill** (Minister of Munitions) informed **Sir C. Henry** (L., Wellington) that the output of aeroplane cloth had been to a certain extent interfered with by the dispute in the factories in the North of Ireland. The employers had not yet obeyed the award which had been given.

The Ministry of Munitions were not directly concerned in the settlement of the dispute, which was dealt with by the Ministry of Labour, but they were the statutory authority for enforcing the award. The question was only referred to them last Tuesday by the Ministry of Labour.

He (Mr. Churchill) was prepared to set the law in motion. He had personally interviewed representatives of both parties, and he learned there was some hope of an amicable settlement, which, while preserving the award, would meet certain difficulties in the settlement.

The Parliamentary Secretary to the Local Government Board (Mr. S. Walsh), the Treasurer of the Household (Capt. F. E. Guest), the member for East Down (Lieut.-Col. Craig), and the member for West Belfast (Mr. Devlin) had consented to use their good offices as mediators between the parties, and he had reason to believe this would be agreeable to the parties. He hoped the result would lead to a satisfactory conclusion without further delay.

TESTING THE LIBERTY ENGINE.

It is reported that the U.S. Bureau of Standards has constructed at Washington a low-pressure building in which to simulate atmospheric conditions at high altitudes up to over 20,000 feet. Provision is made for varying the pressure, so that the engine can be started up under ground-level conditions and the pressure gradually reduced according to the assumed rate of climb.

The chamber is 6 feet by 6½ feet by 15 feet, with walls 12 inches thick, made of concrete and reinforced with steel, and not only is the reduction of pressure arranged for, but provision is made to dispose of the exhaust of the engine. Provision also has been made for the heat produced by the engine which, in the open upper sky, would be dissipated. There is a mounting similar to that for an aeroplane, and the air left in the chamber is kept in rapid motion when tests are on.

One end of the chamber has big refrigeration coils, filled with ammonia, and five big fans provide the circulation.

Openings in the side were made necessary for passage through them of water, ammonia, thermometer, pressure gauges, and other devices. A shaft runs through a stuffing-box to the outside to connect with an electric dynamometer, to record the power up to 450 h.p. The compartment is lined with cork, and the air that supplies the chamber must be brought in at a temperature to correspond with zero Fahr., which aviators find 20,000 feet above the ground.

Surrounding the chamber is the stucco structure, 24 feet by 50 feet, containing the ammonia refrigerating plant, an exhaust blower with a capacity of 1,500 cubic feet a minute, weighing devices, measuring arrangements for estimating water and heat, including the heat which escapes in the water, the heat which escapes in exhaust gases, and also the heat that leaves the engine in the circulating air around it; also for gauging the temperatures of air and water, for indicating the pressure of the air in the vacuum chamber, the volume of air used to supply the engine, the power and speed generated, and various other factors.

Doors leading into the chamber weigh 500 lb. each, and they are made so that the covering will fall off in case of an explosion, that the chamber may not be wrecked. For observing the test portholes covered with glass an inch thick are provided.

One would have thought that a testing truck for use on the railways running over the Rockies would have been a simpler proposition, or it might even have been possible to borrow a live aeroplane and a pilot from the U.S. Flying Service, and to have tested the engine in the real thing, but, jesting apart, no doubt valuable data will be derived from the new plant.

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THE PATENTS INDEX.

The subjoined list of recent inventions has been officially compiled by THE AEROPLANE from the current Official Patents Records.

PATENT APPLICATIONS.

Aston, W. G. Radiators for use on aerial machines. No. 15308. Oct. 22nd.
Barr and Stroud. Range and height finders for anti-aircraft gunnery. No. 15588. Oct. 26th.
Blackburn Aeroplane and Motor Co. Controlling mechanism of aeroplanes. No. 15461. Oct. 24th.
Blackburn Aeroplane and Motor Co. Gripping or clamping devices or jigs. No. 15659. Oct. 27th.
Brothers, E. J. Electric switches for lighting and ignition for aeroplanes, motor-cars, etc. No. 15302. Oct. 22nd.
Burdick, C. L. Process for manufacture of balloons. No. 15374. Oct. 23rd.
Cox, F. J. Apparatus for ascertaining range for dropping bombs from aircraft. No. 15358. Oct. 23rd.
Dews, G. and S. Instrument for use on aircraft or watercraft for indicating position in relation to the horizontal. No. 15448. Oct. 24th.
Fox, H. Wilson.- Aircraft. No. 15483. Oct. 24th.
Hart, H. J. Bomb-dropping apparatus. No. 15443. Oct. 24th.
Hooton, W. Silencer for engines. No. 15587. Oct. 26th.
Leech, S. Jet propeller for flying machines, etc. No. 15570. Oct. 26th.
Melsom, C. L. E. Noiseless propeller action for aircraft. No. 15491. Oct. 25th.
Nieuport and General Aircraft Co. Applying finishes to surfaces of aircraft. No. 15387. Oct. 23rd.
Page, F. H. Prime movers for aircraft. No. 15496. Oct. 25th.
Pescatore, A. B. Aircraft guns. No. 15482. Oct. 24th.
Soper, J. M. Silencing exhaust of internal-combustion engines. No. 15460. Oct. 24th.
Walton, F. Aircraft. No. 15487. Oct. 24th.

COMPLETE SPECIFICATIONS ACCEPTED, PRINTS OF WHICH CAN BE OBTAINED ON AND AFTER NOVEMBER 15TH, 1917

110,407. Oct. 24th, 1916. Springer, R. W. Flying-machines.
110,418. Nov. 1st, 1916. Sopwith Aviation Co., and Sopwith, T. Wind Brakes for aeroplanes.
110,433. May 10th, 1917. Eugen, C. M. Von. Aeroplane fuselages and the like.
110,454. Jan. 3rd, 1917. Robinson, K. W. Steering apparatus for aircraft.
110,472. Sept. 14th, 1916. Brooke, T. P. Flying-boats and wings therefor.
110,534. Sept. 5th, 1917. Connor, T. J. Means to prevent forward tilting of flying machines when on the ground.

ABRIDGMENTS OF RECENTLY PUBLISHED SPECIFICATIONS.

109,099. Internal-combustion engines. WOLSELEY MOTORS, LTD., and WARDELL, T., Adderley Park, Birmingham.

SPRAY CARBURETTORS.—In supplying a combustible mixture to engines used for aircraft, the variation in density of the atmosphere is used to control automatically the flow of petrol through the jet by varying the air pressure on the liquid fuel in the

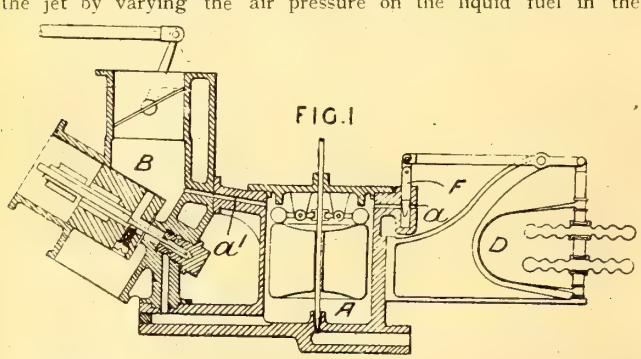


FIG.1

float chamber A. In the apparatus described, an aneroid instrument D, such as is used in a barograph, operates a valve F, which may control either the air admitted above the float through a passage a or the air drawn through a passage a^1 leading from the float chamber A to the mixing chamber B.

109,146. Aeronautics. SOPWITH AVIATION CO. and SOPWITH, T., Kingston-on-Thames.

SHOCK OF LANDING, DEADENING.—A landing chassis for aeroplanes comprises two V-shaped side frames, B B^1, C C^1 connected together by a streamlined strut A having a groove in its upper surface to take two axles E E^1 pivoted at their inner ends and bearing at their outer ends beneath rubber bands K wound around studs X, X^1 on the side frames. Flanges M, H, H^1 are provided respectively on the ends of the axles and the studs X, X^1. A triangular piece O is secured in the apex of each side frame to

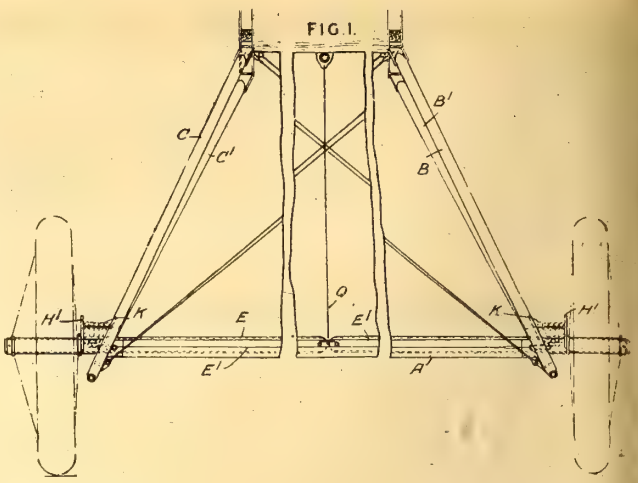


FIG.1.

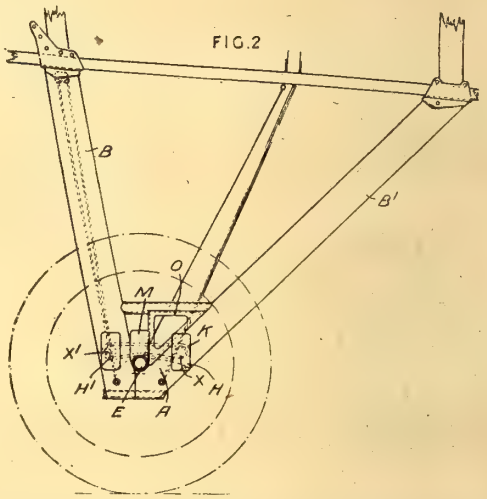
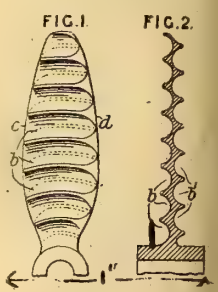


FIG.2

guide the axle-end. The central part of the groove in the strut A, where the axle-ends are pivoted, is reinforced by a metal plate and is provided with an eye-bolt for the attachment of a cable Q.

109,150. Screw propellers. BOURKE, A. M., 404, Bank Chambers, Southampton Buildings, High Holborn, London.

A screw propeller blade has alternating ribs and grooves on each of its faces, the grooves b^1 on the pressure face decreasing in depth from the leading edge c to the following edge d, where they merge into the pressure face, and the grooves b on the tension face decreasing in depth from the following edge to the leading edge, where they merge into the tension face. The grooves are preferably parallel of concentric to the axis.



AIRCRAFT WAGES.

As reported last week, it is officially announced that to meet the urgent need for increased output of aircraft, the Minister of Munitions recently appointed a representative committee to consider the whole position of aircraft woodworkers as to rates of wages and working conditions. The committee recommended the introduction of systems of payment by results, and the establishment of standard district rates, for skilled woodworkers.

With regard to the latter point the Minister of Munitions has decided to make an Order fixing the standard rates for skilled woodworkers in each district on the basis of the standard rates of carpenters and joiners, cabinet makers, or coachmakers, whichever may be the highest, with a minimum of 1s. per hour, as from November 1st.

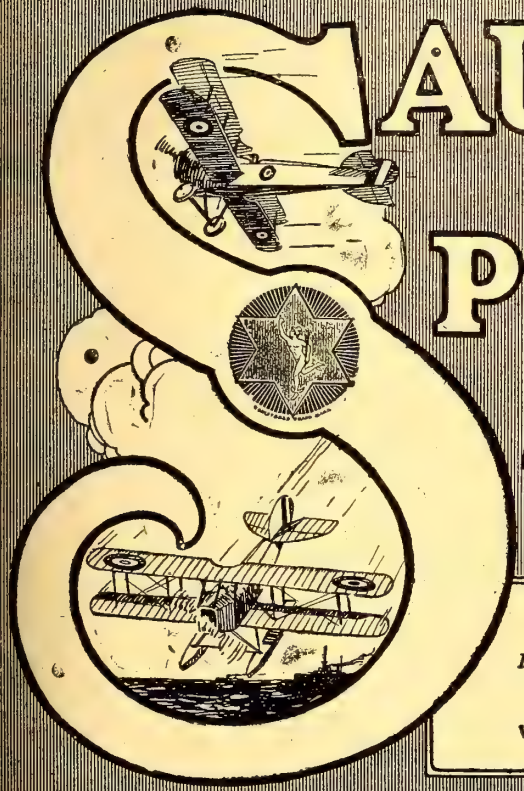
This means that after November 1st the minimum rate for such men in London will be 1s. 3d. per hour. The new rate will include any war bonus that has been given up to date, but will not prejudice men who already have more favourable terms. The other main feature of the Order will be the establishment of overtime rules and other working conditions.

In regard to payments by results, the Minister has intimated that he will approve and support any satisfactory system that may be introduced by agreement between employers and workmen.



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THE AIRCRAFT TRADER

MARKET TOPICS.

Prices given are for quantities on usual terms.

COPPER.—The position in America still continues to attract the chief attention.

The labour question becomes more complex, and the U.S. Government, apparently, cannot see any possibility of fulfilling their own demands, plus the quantities required by the Allies. In consequence, the authorities suspended deliveries against contracts that were outstanding after the official price of 23½ cents was fixed.

In addition to the labour and supplies problems, there appears to be some doubt as to the official price being adequate to cover rising costs, partly due to the higher wages which have to be paid owing to the increasing cost of living.

The price is certainly not very generous; at the same time, the producers have no cause for complaint. The situation generally, as stated previously, is very complex, and is being very anxiously watched from this side. Prices here continue unchanged.

Comparative Prices.

To-day	£110	0	0 per ton.
1915	72	17	6 per ton.
Lowest Price, 1916	84	0	0 per ton.

TIN.—Although the Tin market continues to show a certain amount of uncertainty, the price generally is on the increase. October opened with the price at £243 10s., and is closing with the price in the vicinity of £250 10s., furthermore, there is nothing to indicate that the price will again decline to the low level prevailing at the beginning of the month, in fact, at the time of writing, sellers are very backward in offering supplies, furthermore, shipments are not very certain.

Comparative Prices.

To-day (31st)	£249	0	0
October 29th	250	10	0
October 23rd	247	0	0
October 16th	246	15	0
October 8th	244	10	0
October 1st	243	10	0
1916	182	10	0
Highest Price, 1916	205	0	0

LEAD.—The U.S. price has dropped very considerably; the amount of business done with this country in Lead should, therefore, materially increase. The U.S. Government has not yet fixed the official price, but there are indications that this will be in the vicinity of 5½ cents. Official prices here are unchanged, and supplies are fairly good.

STEEL.—The most important development in the Steel market appears to be the possibility of a further advance in price.

It is generally known that Coal has advanced 2s. 6d., and, in consequence, it is expected that Coke will advance between 5s. and 7s.; the result of these advances, together with recent advances in wages, is bound to indirectly affect all classes of Steel.

Supplies are being well maintained, the result, undoubtedly, of the tremendous exertions which have and are being made to effect a substantial increase in the output of the various mills, particularly those engaged in Aircraft Steels. There is very little hope of obtaining substantial supplies or even small supplies of Swedish Ore in future; the cast-steel situation is, therefore, likely to become most serious; the quality is bound to deteriorate and supplies are likely to be very scarce.

TIMBER.—There is still a very acute shortage of Silver Spruce, in fact, it is well known that several factories have been very seriously impeded owing to the shortage of supplies. As inferred last week, someone should be publicly censured for the present state of affairs. The shipments of Spruce received against the Admiralty Contracts arrived at the end of June, and it must, or should, have been known immediately upon arrival that the Timber would be perfectly unsuitable for aircraft work. If it was not known, why were the inspectors of several private firms prohibited from inspecting the material until it was delivered into their yards?

The impending shortage has been pointed out frequently in THE AEROPLANE, and as far back as July 18th it was stated that "great stocks of Spruce are lying in Canada waiting to be shipped, and merchants fail to understand why the Government do not allow wood to be shipped in sailing vessels, which are practically of no use whatever for Government work."

The position appears to have been aggravated by the lack of foresight, and vigorous, definite action.

There is a little more Mahogany available than was the case a month ago, and the position appears to be a little easier. This cannot, however, be said of Walnut, which is practically unprocurable. The price of English Ash has advanced very considerably, although there are very fair supplies to be obtained.

FABRIC.—The labour troubles are still unsettled, and despite Mr. Churchill's assurance, the outlook is not at all hopeful. There are very definite traces of enemy influence being at work, and the authorities should certainly endeavour to get at the root of it. It is, of course, agreed that this is not an easy matter, especially in Ireland. The output of Fabric is practically at a standstill, and has been for nearly two months: surely it should not take eight weeks to settle a labour dispute in one of the industries which is most vital to our aircraft output.

It would be interesting to know why the price of Fabric jumped from 1s. 11½d. to 2s. 8d. upon the Government taking control of the material. Do they expect the consumer to pay the cost of maintaining a Government Department which was certainly not necessary. It is stated on excellent authority that the mills are only charging the Air Board 2s. 5½d., 36 in. wide.

CURRENT MARKET PRICES.

Nov. 2nd, 1917.

The prices given below are the prices ruling on the above date.

TERMS.—Usual for the various materials mentioned.

Prices of old metals are as quoted by scrap dealers.

Prices must not be taken as specific quotations for definite quantities delivered to any part of the country.

ALUMINIUM.*

Ingot	£225 per ton.
Remelted	£210 per ton.

BRASS.

Sheets	15⅝d. per lb.
Strip	14⅜d. per lb.
Wire	14⅜d. per lb.
Tubes	15¾d. per lb.
Castings	15d. per lb.
Turning Rod	14d. per lb.
Brazed Tubes	19½d. per lb.

COPPER.

Ingot, Standard, Cash	£110 per ton.*
Ingot, Standard, 3 mos.	£110 per ton.*
Best Selected (Nett)	£123 to £119 per ton.
Sheets	£150 per ton.
Wire	15½d. per lb.
Tubes, S.D.	18½d. per lb.
Tubes, Brazed	18½d. per lb.
Rivets	1s. 10½d. per lb., basis.
Tacks	1s. 10d. per lb.

FABRIC.*

Linen, R.A.F., 17C, Spec., 36 in. wide,	2s. 8d. p. yd.
Linen, R.A.F., 17C, Spec., 38 in. wide,	2s. 9½d. p. yd.
Spaced, R.A.F., 17C, Spec., 37½ in. wide,	1s. 9d. p. yd.

GUN METAL.

Castings	1s. 8d. per lb.

LEAD.*

Virgin Pig	£29 per ton, c.i.f.
Virgin Pig	£30 per ton, ex stores.
Sheets	£39 10s. per ton, D/d.
Pipes	£40 per ton.
Dry White	£46 10s. per ton. less 5 per cent.
White in Oil	£53 per ton.
(lots over 5 cwt. less 5 per. cent.)	
White in Oil	£55 per ton.
(lots under 5 cwt. less 5 per cent.)	
Red, in Oil	£42 per ton, less 2½ per cent.

NICKEL.

Nickel	£200 per ton.

PHOSPHOR BRONZE.

Ingots, 5 cwt., and under	£150 to £170 per ton.
(Subject to Copper and Tin Fluctuations.)	
Castings	1s. 7d. to 1s. 9d. per lb.

Telegrams "Aviation" Norwich. 'Phone No 651 Norwich



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Silver .....43d. per oz

SOLDER.

Plumber's .....103s.
Tinman's .....135s.

STEEL. * ‡

High Speed, 14 p. cent., Tungsten, 2s. 10d. per lb., basis.
High Speed, 18 per cent., Tungsten, 3s. 10d. per lb., basis.

ALLOY STEELS TO AIR BOARD SPECIFICATIONS.

Round and Square :—

Specification No. S2	£86
Specification No. S2 (bright-drawn)	£115
Specification No. S8	£86
Specification No. S10	£70
Specification No. S12	£75
Specification No. S14	£43
Specification No. S15	£70
Specification No. S16	£70
Specification No. S17	£75
Specification No. S18 (oil-hardened)	£86
Specification No. K1	£75
Specification No. K2	£75
Specification No. K3	£86

The above prices are for ¼ in. to 5/16 in. only, other sizes are proportionate.

HEXAGONS.* ‡

	.455 and .525	.601 and .710
Specification S2	£79	£77
Specification S8	£79	£77
Specification S2 (bright-drawn),	£112	£112
Specification S8 (bright-drawn),	£112	£112

SPELTER.*

English f.o.b., Birmingham £57

TIN.

Tin .....£250 10s.

TINPLATES.

Tinplate .....30s., basis, f.o.t.

TIMBER.†

	Official.	Merchants.
Silver Spruce,	10s. 4d.	17s. 9d., c.f.
English Ash		16s., c.f.
Mahogany,	1s. 6d. to 1s. 10d.	2s. 2d. to 2s. 6d., s.f.
Walnut,	2s. to 2s. 3d.	2s. 3d. to 2s. 6d., s.f.

ZINC.

Zinc Sheets (American).....£110, f.o.b., New York.

SCRAP MATERIALS (LONDON PRICES).

ALUMINIUM.

Description.	Price per ton on sale to refiner, delivered at refinery.
Sheet cuttings and rods containing a minimum of 96 per cent. Al.	£160 0 0
Old rolled, etc., containing a minimum of 96 per cent. Al.	120 0 0
Spinnings, punchings, and thin small scrap; also painted and varnished scrap that needs melting, containing a minimum of 96 per cent. Al.	105 0 0
Lump scrap from aero castings and material of equivalent value, containing 87 to 95 per cent. Al.	100 0 0
Turnings and Swarf, generally containing 87 to 95 per cent. Al.	87 10 0
Scrap, generally containing 80 to 86 per cent. Al.	80 0 0
Swarf and inferior Swarf, generally containing 80—86 per cent. Al.	70 0 0
All Scrap, containing below 80 per cent. Al., not to exceed	65 0 0
All Swarf, containing below 80 per cent. Al., not to exceed	60 0 0
Brass, Heavy Selected	£88
Copper, Clean	97
Copper, Brazery	78
Gun Metal, Scrap	118
Lead, no Draft	26
Zinc, Old	40

*Official Prices.
†Includes Selection and Delivery.
‡Prices include Delivery in the U.K.

AIRCRAFT SUPPLIES.

The current issue of "Aircraft Supplies," the house organ of the Aircraft Supplies, Ltd., contains, among other features, an interesting chart of "Equivalent Breaking Strains for Turnbuckles," an article on "Dope and How to Use It," by Mr. A. J. Wallace Barr, and an extract from "The Book of Artemas."

The readers of this little news-sheet cannot complain of lack of variety.

It has been found that the stock-lists contained in this journal are of considerable value to aircraft manufacturers, and it is obvious that the number of differing articles in stock increases with each issue.

The proprietors propose to include in all future issues a series of original tables of particular interest to aircraft manufacturers and designers, all of which are intended to save time and give assistance in the proper organisation of aircraft stores and drawing offices.

The next issue, to be published on Nov. 8th, will contain an article by Mr. G. H. Mansfield on "The Manufacture of A.G.S. Bolt and Nuts," and will include a very valuable table showing the weights and lengths of steel bars required per gross for various A.G.S. sizes. This same issue will contain an article on "Standard A.G.S. Parts for Aircraft," by Mr. Bernard Isaac, and will include several highly-interesting charts of A.G.S. standard parts.

Following issues will contain charts dealing with separate weights of principal A.G.S. parts in decimals of an ounce, a chart of A.G.S. washers, a comprehensive table showing at a glance A.G.S. numbers for all parts, and a table showing quantity of rivets, panel pins, gimp pins, brass brads, etc., to a pound or ounce.

Copies of "Aircraft Supplies" are sent free regularly on request to all firms connected with the Aircraft Industry and to those in charge of works or service stores and departments on receipt of applications on business or official paper addressed to "Ascol" House, 125, Long Acre, W.C.2.

MILITARY REPRESENTATIVES AND THE AIRCRAFT INDUSTRY.

The "East Ham Echo" of September 21st published an interesting paragraph showing that the authorities are really beginning to recognise the importance of aircraft work, and that in certain districts at any rate the military representatives of the tribunals are alive to that fact that men in non-essential occupations may by their particular training be particularly valuable in producing aircraft.

The paragraph in question reads as follows :—"Lieut Wrentmore, the able military representative at the East Ham Tribunal, is an 'Admiral Crichton' in his way. He knows a bit of everything, and keeps his eyes wide open for fish—we are all of us the fish, by the way—for the Army or National Service net. Just now the Army fish seems to be getting a little scarce at the Tribunal; but here and there the indefatigable lieutenant succeeds in snapping up an individual of low medical category for the Army Pay Corps or the aeroplane factories. There is a great demand just now for qualified carpenters and joiners, mechanics, etc., at the aeroplane factories; and if all military representatives are as wide awake as Lieut. Wrentmore, the demand will speedily be met."

Undoubtedly very much can be done by such appreciation of present necessities as is shown by Mr. Wrentmore. Naturally, carpenters, cabinet-makers, joiners and mechanics of all sorts are particularly valuable in aeroplane factories, but there are many subsidiary occupations which are equally valuable in industries subsidiary to the Aircraft Industry. For example, watchmakers are particularly suitable in employment on the production of navigating instruments, such as speed indicators, aneroids, revolution indicators, and so forth. Tailors and cutters would doubtless be equally of use in preparing fabric for the covering of wings or on the manufacture of balloon envelopes, or on fitting canvas for portable aeroplane sheds. Tin-box makers would be useful in making petrol tanks. In fact, in these days, there are few non-essential industries which cannot contribute in one way or another to the production of the aircraft, which are now more than ever necessary to the defence of this country and the defeat of the enemy.

AMERICAN INDUSTRIAL NOTES.

On Oct. 3rd Major-General George W. Goethals, of Panama Canal fame, was elected president of the Wright-Martin Aircraft Corporation.

According to the American technical newspapers, the order for 450 Hispano-Suiza motors built by the firm for France was unprofitable, owing to the low price at which it was accepted and the high cost of material. The same source of information reports that the firm has received an order from the U.S. Government for Hispano-Suiza engines, alleged to be of 250 h.p., to the number of several thousands for delivery by the end of 1908.

The annual statement presented to the Board showed at May 31st a deficit on the profit and loss account of $1,930,387, the result chiefly of losses in making the first engines turned out. The total assets of the company are $10,566,538.

* * *

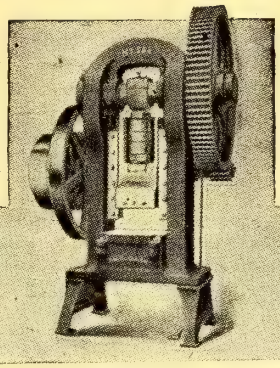
According to "Automobile and Automobile Industries," New York, the French Renault and Brazier Companies are to make the "Liberty" engine in France, apparently chiefly for replacement purposes in American aeroplanes.

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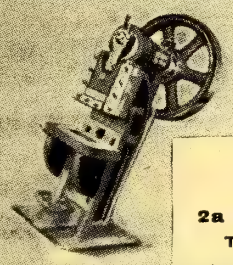
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AIRCRAFT FINANCE

WHITEHEAD AIRCRAFT (1917), LTD.

Authorised Capital, £1,000,000.

Advertisements in the form of Articles issued by this Company have been appearing in various newspapers for some time past, and continue to appear under a variety of prettily conceived headings and subheadings, of which the following may be considered a fairly representative selection :—

"Aircraft : The New British Industry."

"The Nation Will Have It. Bomb Germany!"

"All Must Help to Make the Pace in the Race for the Air Conquest."

"A National Effort is Needed. Forget the Zepps and Get Busy on Our Aeroplanes."

"Progress of Aerial Warfare. The Future of the Winged Navies."

"Winged Victory. In War and Peace."

"A Sure Shield in the Air," etc., etc.

There are more, but these suffice for the present. The purport of all are the same, to induce as many as possible to write to Whitehead Aircraft, Ltd., for a copy of "Aircraft. The New British Industry."

Important Facts.

Official records concerning this Company disclose important details concerning the arrangements made between Mr. A. J. Whitehead and the Company. No publication of these arrangements were necessary in the public interest unless and until the Company notified its intention of appealing to the public for subscriptions, for, so long as the Company was conducted as a private Company, any agreement, however unusual, was not a matter of public interest, but in an advertisement issued by the Company in a popular periodical, dated November 3rd, the following statements appear :—

They (Whitehead Aircraft, Ltd.) are "applying to the Treasury for permission to increase their capital," and they are to appeal to the British public to invest their savings in the enterprise.

Notwithstanding the many advertisements which have appeared in the Press, this is the first intimation given officially of the intention of the Company to appeal to the public for funds, and it is, therefore, only now that the duty of disclosing the facts on record must be fulfilled in the interests both of the general investing public, and in the interests of the Aircraft Industry in general.

This Company was registered on September 7th, 1917, with a capital of £1,000,000.

Clause 98a of the Memorandum and Articles of Association of the Company provides that :—

"Mr. A. J. Whitehead is nominated Governing Director of the Company for life, with the *continuing* right to appoint two directors *who shall not be subject to retirement by rotation.*

" They shall continue in office unless requested *by the Governing Director to resign.*

" *No Meeting of Directors or Resolution passed by the Board shall be valid unless the Governing Director is in attendance,* and shall as to such resolution *vote in favour thereof.*

" In the event of the Governing Director ceasing to be Governing Director, he shall have the power to appoint another to such office in his stead, and in the event of the Governing Director dying, *his legal personal representative shall have power to appoint another* to such office, and such appointment shall, in either case, have all the rights and powers hereby conferred on the *Governing Director.*"

Paragraph 114 :—A Director shall be disqualified (F) if he receives a notice signed by all the other Directors, not being less than three, *and including the Governing Director, requiring him to resign.*

Paragraph 115 :—No Director shall be disqualified by his office through contracting with the Company, providing he discloses his interest, *but this prohibition shall not apply as to A. J. Whitehead or his alternate.*

Such autocratic powers are fortunately a novelty in connection with English companies. One learns that the qualification of the Governing Director is that he shall merely be a shareholder, and is qualified to hold office providing he owns one share, which may be a deferred share of the nominal value of 1s.

He has power to nominate two Directors besides himself, who may be called upon at any time and in any circumstances it may please him, to vacate office. What type of Director would hold office under such conditions is hard to imagine. But that no meeting of Directors or Resolution is valid unless the Governing Director is in attendance, and shall vote in favour of the Resolution, means, if it means anything at all, that Mr. Whitehead and Mr. Whitehead alone, may, notwithstanding all the protective clauses of the Companies' Acts, do just what he wills, when and how he pleases, even if he only holds one deferred share of a nominal value of 1s.

I shall be very much astonished to learn that Treasury consent is ever granted to this Company. The Treasury will probably regard very unfavourably the advertisements which the Company have already issued, even if they do not altogether refuse the consent to any public issue, on the grounds of the arrangements between Mr. Whitehead and the Company, as inimical to the interests of the shareholders.

Without such Treasury consent the Committee of the Stock Exchange would never allow such shares to be officially quoted.

Young as is the Aeroplane Industry, there has already been sufficient money lost by the investing public in aeroplane ventures, and the future, more particularly the near future, demands very careful watching if the Industry is to take its proper and appointed place in the ranks of sound industrial investments.

What is a Balance-sheet? Further Comment.

An extremely interesting communication reaches me from a correspondent on this important subject, who, under the nom-de-plume of "Justat," writes :—"Please accept the expression of my admiration for the attitude you adopt in your article under the above heading from one who is a shareholder in several companies, and a member of the Legal Profession. The letter you print, signed 'Chartered Accountant,' in your last week's issue, undoubtedly represents the accepted view of the professional accountant, which I agree with you is wrong, and likely to lead to abuse. Section 26 of the Companies' Acts provides that every company having a share capital shall once at least, in every year, file with the Registrar of Joint Stock Companies, the statements giving particulars of the capital, liabilities and assets of the Company. Unfortunately, the Act does not go farther, but there are recorded cases which may be accepted as the law dealing with this specific point.

"Lord Justice Lindley laid down the following ruling in a famous case on appeal.

> " 'A person whose duty it is to convey information to others does not discharge that duty by simply giving them so much information as is calculated to induce them, or some of them, to ask for more. Information and means of information are by no means equivalent terms. . . . An auditor who gives shareholders means of information, instead of information, in respect of a company's financial position, does so at his peril, and runs the very serious risk of being held judicially to have failed to discharge his duty,'

and in the same case Lord Justice Rigby concurred in the judgment in the following words':—

> " ' The words, " as shown by the books of the Company," seem to me to be introduced to relieve the auditors from any responsibility as to affairs of the company kept out of the books and concealed from them, but not to confine it to a mere statement of the correspondence of the balance-sheet with the entries in the books. Now, a full and fair balance-sheet must be such a balance-sheet as to convey a truthful statement as to the company's position. It must not conceal any known cause of weakness in the financial position, or suggest anything which cannot be supported as fairly correct in a business point of view.' "

Nothing that I am able to add can make the position clearer. It is a matter of surprise that the Institution of Chartered Accountants does not lay down a set of rules for the guidance of its members. The responsibility, however, lies with the shareholders themselves, they have it in their power to demand and compel such disclosures as they require. They apparently lose sight of the fact that they are the proprietors, and that the directors and auditors are but their paid servants. Unfortunately, so few shareholders understand a balance-sheet, but it is high time that the question should be dealt with seriously by the ruling powers.

G. A.

ANSWERS TO CORRESPONDENTS.

The Financial Editor will be pleased to answer in these columns inquiries on any subject affecting or relating to Investments, Stocks, Shares and Securities of Aircraft and kindred companies, free of charge.

"INVESTMENT" (Norwich).—The present quotation is "ex div.," consequently a purchase at the present moment would not entitle you to receive the dividend just declared, as this dividend would be the property of the seller.

"IN DOUBT" (Brighton).—The delay in the issue of the certificate is, no doubt, due to the common cause from which all offices just now are suffering—that of depleted staffs. In normal times certificates were usually prepared and delivered in twenty-one days. At present the preparations of new certificates generally demand one month, but for all practical purposes, the transfer receipt which you hold covers your position.

"RUSTIC" (Maidstone).—The shares, being only partly paid, the liquidator has legal right to call upon you to pay up the balance remaining uncalled on the shares, and may proceed to enforce payment by legal proceedings if you fail to comply.

NEW COMPANIES REGISTERED.

The files of the following new companies, registered wtih the nominal capitals of £5,000 and upwards, are now available for inspection at Somerset House :—

MORTLAKE AIRCRAFT CO., LTD.—Registered Oct. 30th. Nominal capital, £10,000 in £1 shares. Registered Offices, 37, Sheen Lane, Mortlake.

SUPER AVIATION CO., LTD.—Registered Oct. 31st. Nominal Capital, £10,000 in £1 shares. Registered Offices, 154, Dalston Lane, E.

ROLLS-ROYCE BALANCE-SHEET.

After long delay, the figures of Rolls-Royce (Ltd.) for the year ended Oct. 31st, 1916, are available, and show a very large accession of profits. After paying or providing for all trading expenses, liberal depreciation of buildings, machinery, and plant, and after charging repairs and replacements to revenue, and writing down additions thereto to estimated post war values, the trading for the year ended Oct. 31st, 1916, resulted in a net profit of £82,640, as compared with £44,171 the previous year. With £31,475 brought forward the available amount is £114,116. At the meeting on March 9th last the recommendation of the directors to pay a dividend at the rate of 10 per cent. was approved by the shareholders, and subsequently distributed. After transferring £20,000 to the debt guarantee fund and £30,000 to the credit of income-tax account, the carry forward is £44,116, or £12,641 more than was brought in.

THE AIRCRAFT MANUFACTURING CO.'s ISSUE.

It is gratifying to note that the issue of shares in the Aircraft Manufacturing Co., Ltd., announced last week has been very largely over-subscribed. It seems highly improbable that investors in this company will ever have cause to regret their investment as the firm is thoroughly well managed and is blessed with a far-seeing and enterprising directorate.

The fact of its being so largely over-subscribed is evidence that the moneyed public is not only willing, but anxious to invest in aircraft shares, owing to the present boom in aviation, and, therefore, it is all the more desirable that investors should be on their guard against much-promising, but unsound investments, and the "planting" of shares in unsound firms by dealers of the kind, which are commonly called "bucket-shops."

There will doubtless be plenty of opportunities to invest in sound firms, and it will be the business of this paper to see to it that the interests of the public are thoroughly well protected in financial matters.

AIRCRAFT EXPERIMENTAL AND ACCEPTANCE TESTS.

His friends will be interested to learn that Mr. Clifford B. Prodger, of the Prodger-Isaac Aviation Company, the well-known firm of test pilots, has now quite recovered from the severe chill which he recently contracted while carrying out experimental flights on a small flying boat in a rough sea. Mr. Prodger is now hard at work again, and is at present specialising in experimental and acceptance tests on Handley Page Land Machines and big Flying Boats.



Mr. Clifford B. Prodger.

Contractors or sub-contractors who require the services of sound, experienced pilots in connection with this or other work are recommended to communicate with this firm, who are in a position to quote low inclusive fees, which would include full insurance of the machines at Lloyd's against all risks for flights made prior to acceptance by the Air Board.

At a time when so much attention is being drawn to the question of supply of big bombing machines, it is interesting to note that practically the whole of the experimental work and acceptance trials on the huge Handley Page "Bombers" were carried out by Mr. Prodger.

Mr. Prodger is assisted in his work by several well-known pilots, including Mr. J. Lankester Parker, who has earned for himself an excellent reputation as a seaplane test pilot. The firm are now in a position to assist new firms, so far as production is concerned, and are prepared to make reports from a pilot's point of view on designs for new machines.

They are also prepared to survey and report on private aerodromes, and several firms who are proposing to lay out ground for this purpose adjoining their works have already consulted Mr. Prodger in this connection. Enquiries should be addressed to the Company's offices at 166, Piccadilly, London, W.1.

A NEW APPOINTMENT.

Mr. C. T. Murray-Smith, who has been for a considerable period associated with the manufacture of the Avro biplanes as works manager at one of Messrs. A. V. Roe & Co., Ltd.'s, works, has now taken up the position of works manager to the aviation department of Crossley Motors, Ltd.

MOTORING.

A hint of the ever-growing activities of the Sunbeam Motor Car Co., Ltd., is afforded by the decision of the Board at its last meeting to appoint Mr. George F. Mortimer, A.C.I.S., to be secretary of the company, thereby releasing Mr. W. M. Iliff of that portion of the work and freeing him to devote his entire energies to his duties as joint managing director with Mr. Louis Coatalen, chief engineer of the firm. Mr. Mortimer has ably assisted Mr. Iliff for the past seven years, during the last three of which he has acted as assistant secretary to the company.

CURRENT SHARE QUOTATIONS.

The following are the share quotations made up to Tuesday morning in each week of the principal companies engaged in the Aircraft Industry and Kindred Trades.

Aircraft Mnfg. Co	7% cum. pref. £1 ...	23/-	24/-
Armstrong Sir W. G.) Whitworth & Co., Ltd.	4% cum. pref. £5...	3¾	3¾
	5% 2nd. pref. £1 ...	17/-	18/-
	£1 ordinary	39/6	40 6
Austin Motor Co., Ltd.	7% cum. pref. £1...	18/-	19/-
	£1 ordinary	26/6	27/6
Birmingham Small Arms Co., Ltd.	£1 ordinary	52/3	53/6 x
	5% cum. "A" pref.	4-5 16	4-7 16
	6% cum "B" pref.	19/-	20/- x
Boulton & Paul, Ltd., 5% cum pref. £1		⅜	⅞
Brown Bros., Ltd., 6% cum. pref. £5...		4½	4⅝
Darracq (A) & Co., (1905) Ltd.	£1 ordinary ...	38/-	39/-
	7% cum pref. £1 ..	23/-	24/-
Electric Construction Co., Ltd.	7% cum. pref. £1...	19/3	19 6
	£1 ordinary	1	1-1/16
Fellows Magneto Co., 8% cum. participating pref.		17/-	18/-
General Electric Co., Ltd.	6% cum. pref. £10	10-5/16	10-7/16
	£10 ordinary	17	18
Gwynnes, Ltd., 5% cum. pref.		91/-	92/-
Ordinary		8/3	8/6
Greenwood & Batley, Ltd., £10 ordinary		9	10
Humber, Ltd., 6% cum. pref. £1		17/-	18/-
£1 ordinary		17/-	18/-
Napier (D) & Son, Ltd., 7⅜% cum. pf. £1		18/-	18/6
Peter Hooker, Ltd., £1 7% cum. partic. 1st pref.		20/-	21/-
Rolls Royce, Ltd.. £1 ordinary		57/6	58/6
Rudge Whitworth, Ltd. £1 ordinary ...		40/-	41/-x
Ruston Proctor & Co., Ltd.	£1 ordinary	26/-	27 -
	5% cum. pref. £1 ...	17/-	17/6
Sunbeam Motor Car Co., Ltd.. £1 ord ..		88/-	89/-
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S. Smith & Son, Ltd. (Motor Accessories) £1 ordinary		26/-	27/-
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Vickers, Ltd., 5% pref. stock...		78	82
5% pref. shares. £1 ...		17/-	18/-
£1 ordinary		39/-	40/-
Wm. Beardmore & Co., Ltd., 6% c. pf. £1		19/-	19,6

GENERAL INFORMATION.

Armstrong, Whitworth (1916).
Austin Motor (1916).
B'ham. Small Arms (1915-16).
Rolls Royce.
Rudge Whitworth.
Straker-Squire (1915).
Sunbeam Motor.
Thorneycroft (J. I.) & Co.
Vickers (1915 and 1916).

Owing to the difficulty of estimating liabilities under Finance and Munitions Acts, the accounts will not be ready until a later date.

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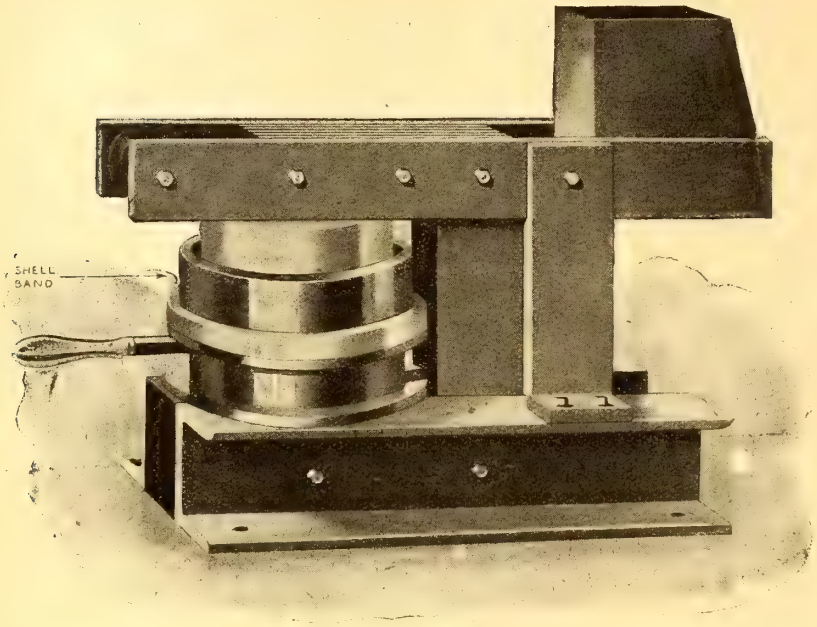
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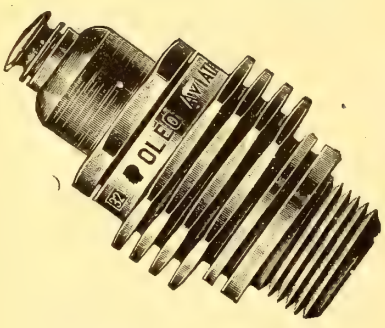
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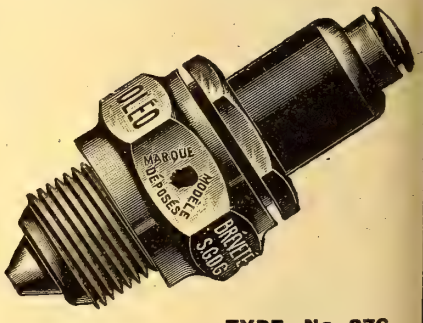
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(*Continued from page* 1332.)

After midnight, when the weather suddenly cleared, our bombing squadrons dropped over two tons of explosives on Roulers and Ingelmunster stations, as well as on moving trains and hostile billets. One German machine was brought down in combat, and one of our machines is missing.

Following on those of the night of the 29th-30th inst. and of yesterday morning, another raid into Germany was carried out by our machines last night. On this occasion the steel works and station of Völklingen, north-west of Saarbrücken, were attacked with excellent results. Direct hits were observed on the furnace and power-house, and on a train.

The weather, which was brilliantly fine during the early part of the raid, turned later to rain and snow.

In spite of this, all our raiding machines returned except one.

Nov. 1st, 9.54 p.m.—On the 31st ult. advantage was taken of the change in the weather, and both our own and the enemy's areoplanes were in the air all day.

Visibility was not very good, and hindered artillery work, but a great deal of bombing was carried out by our machines and many photographs were taken.

Our aeroplanes also co-operated successfully with the raid carried out by our infantry yesterday afternoon north-east of Loos (reported in last night's communiqués), firing several thousand rounds from their machine-guns, and dropping bombs on hostile troops in communication trenches

During the day five tons of bombs were dropped by us on Roulers, causing fires and explosions, and on many hostile billets. At night a further 2½ tons were dropped on aerodromes in the neighbourhood of Courtrai, the aerodrome at Gontrode, and railway stations at Roulers, Thourout, and Courtrai.

Two trains were attacked from a low height; one of them was derailed, and the other completely destroyed.

Enemy aircraft were more active and aggressive than they have been for some days, attacking our artillery bombing machines.

In air fighting seven hostile machines were brought down. Nine of our machines are missing.

To-day another successful raid was carried out into Germany. The munition factories of Kaiserslautern, about 36 miles north-east of Saarbrücken, were attacked by two groups of six machines each. Cloudy weather impeded accurate bomb-dropping.

One of the groups encountered the enemy's defending scouts, and brought one of the latter down.

All our machines returned safely.

Nov. 2nd, 9.4. p.m..—On the 1st inst very little flying was possible owing to the low clouds and rain. One of our pilots flew through the clouds, which were at a height of 200 feet, to Gontrode aerodrome and dropped two heavy bombs. The drizzle and heavy anti-aircraft fire prevented observation of the results.

On Oct. 31st our anti-aircraft guns shot down one of the enemy's bombing machines. This is in addition to the seven hostile machines already reported as brought down on that day.

Nov. 3rd, 9.12 p.m.—On the 2nd inst. unfavourable weather conditions greatly interfered with flying, and there is nothing to report.

Nov. 6th, 9.0 p.m.—On the 4th instant, owing to thick mist, little flying was possible except on the coast. In this sector successful artillery work and photography were carried out, and one German aeroplane was brought down in air fighting.

None of our machines are missing.

War Office Communiqué.

Nov. 1st.—The G.O.C. the British Forces in Mesopotamia reports :—

On the morning of Oct. 31st our aeroplanes dropped bombs on the enemy's aerodrome at Kifri, about 100 miles north-north-east of Baghdad, with good results.

Nov. 3rd.—The G.O.C. British Forces in Macedonia reports :—

During the past week our aeroplanes have bombed hostile camps and dumps on the Belashitza mountains at Cestovo, north-west of Lake Doiran, and at Ciftlidzik, south of the Rupel Pass.

Home Command Communiqués.

Oct. 30th, 12.45 p.m.—No casualties or damage were caused by last night's air raid.

The enemy machines were unable to penetrate far inland owing to the activity of our own aircraft, which went up to meet them in spite of the rising gale.

Oct. 31st, 10.20 a.m.—At 4.30 a.m. a hostile aeroplane crossed the Kentish coast.

The enemy machine did not penetrate inland and, on being engaged by our anti-aircraft guns, immediately dropped its bombs in fields and made off to sea, dropping the rest of its bombs in the water.

No casualties or damage were caused.

Nov. 1st, 12.15 a.m.—Hostile aircraft crossed the South-East coast in relays between 10.45 and 11.50 p.m. on October 31st, and proceeded towards London.

The raid is still in progress.

Nov. 1st, 12.15 p.m.—Determined and repeated attacks were made upon London last night by groups of hostile aircraft.

The first group of raiders crossed the Kentish coast about 10.45 p.m., and proceeded over Kent towards London. They did not penetrate far inland, however, but turned eastward, and dropped bombs at various places in and near the coast.

Meanwhile, two more groups of raiders were steering towards London along the south bank of the Thames. The sky was half to three-quarters covered with low, thin clouds, which rendered observation of the enemy machines extremely difficult. None the less, their altitude was correctly calculated, and they were broken up by the barrage fire on the south-eastern outskirts of the metropolitan area about 11.50 p.m., where some bombs were dropped.

A fourth group of machines, which came along the Thames estuary, was turned back about halfway to London.

Meanwhile, a fifth group crossed the Essex coast about 12.15 a.m., and steered towards London by way of the north bank of the Thames. Some of these raiders were turned back by the outer defences, but one or more penetrated into south-east London, where bombs were dropped.

A sixth group followed along the same course about a quarter of an hour later. Some of these machines penetrated into the south-east outskirts of London, where bombs were dropped. Meanwhile, one or more enemy machines dropped bombs in the south-western outskirts of London.

A seventh group, which approached along the south bank of the Thames, was dispersed by gunfire before reaching the outer London defences. In addition, individual raiders attacked the Kentish coast between midnight and 1.30 a.m.

Reports indicate that each group consisted of three or four machines, the total number of raiders engaged being about thirty.

Of this total only about three machines succeeded in actually penetrating into the heart of London.

The raiders were harassed by gunfire during the whole of their flight, and were also attacked by our own aircraft. The facility with which they were able to escape observation by taking advantage of cloud prevented any decisive engagement.

Full reports have not yet been received, but those already furnished point to comparatively light casualties and damage, considering the number of machines and the determined nature of the attack.

3.15. p.m.

Latest police reports state that the total casualties caused in last night's raid in all districts were :—

Killed, 8. Injured, 21.

Material damage was very slight, and no injury was done to any naval, military, or munitions establishment.

A large number of our own machines went up, and all returned safely.

The Casualty List.

Reported Oct. 31st.

Died of Wounds.—Shone, Lt. G., M.C., S. Staff. R., attd. R.F.C.
Cunningham, Sec. Lt. J. N., R.F.C.

Wounded.—Hepworth, Sec. Lt. A. H., R.F.C.
Sleep, Lt. A., R.F.C.

Missing.—Bartlett, Sec. Lt. C. H., R.F.C.
Ferguson, Sec. Lt. C. E., R.F.C.
Park, Sec. Lt. S. M., R.F.C.
Perry, Sec. Lt. B. B., R.F.C.
Swann, Sec. Lt. G. H., R.F.C.

Reported Nov. 1st.

Killed.—Falkner, Sec. Lt. W. H., R.F.C.

Previously reported Missing, now reported Killed.—Adam, Lt. A. R., Sea. High., attd. R.F.C.
Bell, Sec. Lt. E. A., R.F.C.

Wounded.—Castle, Sec. Lt. A. F., R.F.C.
Hirst, Sec. Lt. H., R.F.C.
Hutton, Sec. Lt. H. M., R.F.C.
Lawrence, Sec. Lt. I. H., R.F.C.
Quinn, Sec. Lt. T. L., R.F.C.
Slade, Sec. Lt. R. B., R.F.C.
White, Sec. Lt. A. S., R.F.C.

Missing.—Farquharson, Sec. Lt. F. B., R.F.C.
Watts, Sec. Lt. W. E., R.F.C.
Wilson, Lt. J. R., R.E., attd. R.F.C.

Indian Force.—Missing.—Steele, Sec. Lt. R. B., I.A.R.O., attd. R.F.C.
Taylor, Sec. Lt. A. G. V., I.A. Inf., attd. R.F.C.

Canadian Contingent.—Wounded.—Weegar, Lt. E. C., Rly. Troops, attd. R.F.C.

Missing.—Owen, Capt. D., Can. Gen. List, attd. R.F.C.

Reported Nov. 2nd.

Killed.—Clarke, Capt. S. H., M.C., Wilts R., attd. R.F.C.
Skelton, Sec. Lt. F., R.F.C.

Previously reported Missing, now reported Killed.—Anderson, Sec. Lt. R. W. L., R.F.C.
Campbell, Sec. Lt. J. K., R.F.C.
Ferriman, Lt. F. S., Oxf. and Bucks. L.I., attd. R.F.C.
Lowe, Lt. M., R.F.C.

Proud, Sec. Lt. J. R. S., R.F.C.
Robertson, Sec. Lt. D. N., R.F.C.
Workman, Lt. C. S., M.C., Sco. Rif., attd. R.F.C.
DIED OF WOUNDS.—Dixon, Sec. Lt. C. P., R.F.C.
Hunter, Sec. Lt. P. C., N. Staff. R., attd. R.F.C.
DIED.—McCracken, Sec. Lt. H. J., R.F.C.
WOUNDED.—Humphreys, Sec. Lt. D. d'H., Lond. R., attd. R.F.C.
Johnson, Sec. Lt. J. T., R.F.C.
Shanks, Sec. Lt. D., R.F.C.
Spark, Sec. Lt. W. S., R.F.C.
Thorpe, Sec. Lt. E. T., R. War. R., attd. R.F.C.
Walter, Sec. Lt. H. L., Dn. Gds., attd. R.F.C.
Wesson, Sec. Lt. J. S., Worc. R., attd. R.F.C.
MISSING.—Edwards, Sec. Lt. G. R., R.F.C.
Harker, Sec. Lt. B., Lan. Fus., attd. R.F.C.
Hempel, Sec. Lt. A. E., R.F.C.
Hill, Capt. H. O. W., R.F.C.
Hills, Sec. Lt. O. M., M.C., R.F.C.
Yeomans, Sec. Lt. F. L., R.F.C.
PREVIOUSLY REPORTED PRISONER, NOW REPORTED WOUNDED AND PRISONER IN GERMAN HANDS.—Partington, Lt. O. J., R.F.C.
PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONERS IN GERMAN HANDS.—Humble, Sec. Lt. T., R.F.C.
Ibbotson, Sec. Lt. H., R.F.C.
AUSTRALIAN FORCE.—MISSING.—Agnew, Lt. I. C. G., Fl. Corps.

Reported Nov. 3rd.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—West, Sec. Lt. T., R.E., attd. R.F.C.
DIED.—Terry, Sec. Lt. J. E., R.F.C.
MISSING.—Barbour, Sec. Lt. H. D., R.F.C.
Cowie, Sec. Lt. G., R.F.C.
Goodbehere, Sec. Lt. P., Manch. R., attd. R.F.C.
Kann, Lt. E. H., R.F.C.
Smith, Sec. Lt. W. R. S., R.F.C.

CANADIAN CONTINGENT

DIED.—White, Lt. R. J. S., Man. Regt., attd. R.F.C.
WOUNDED.—McInnis, Lt. T. J., Sask. R., attd. R.F.C.

Reported Nov. 5th.

KILLED.—Balaam, Lt. A. O., Suff. R., attd. R.F.C.
PREVIOUSLY REPORTED WOUNDED, NOW REPORTED KILLED.—Rooper, Capt. W. V. T., Yeo., attd. R.F.C.
WOUNDED.—Wood, Sec. Lt. C. G., R.F.C.
PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONERS IN GERMAN HANDS.—Deason, Lt. T. G., Yeo., attd. R.F.C.
Hall, Sec. Lt. W. E., Lond. R., attd. R.F.C.
Ellerbeck, Sec. Lt. E. A. V., Yeo., attd. R.F.C
CORRECTIONS.—PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—Mall Smith, Lt. G. E., M.C., R.F.C., should read Miall Smith, Lt. G. E., M.C., R.F.C.

Reported Nov. 6th.

KILLED.—Prince-Smith, Lt. D. S. P., R. Dub. Fus., attd. R.F.C.
Sharland, Sec. Lt. F. J., R.F.C.
WOUNDED.—Ford, Sec. Lt. T. A., R.F.C.
Jenkins, Sec. Lt. H. F., R.F.C.
MacDougall, Sec. Lt. P. A., R.F.C.
Meyler, Maj. H. M., M.C., Bord. R., attd. R.F.C.
Parker, Sec. Lt. F. H., R.F.C.
MISSING.—Golding, Sec. Lt. K. L., R.F.C.
Laing, Sec. Lt. J. D., R.F.C.
March, Sec. Lt. W. F. G., R.F.C.
Milne, Capt. J. T., M.C., R.F.C.
Wright, Lt. S., M.C., R.E., attd. R.F.C.
CANADIAN CONTINGENT.—ACCIDENTALLY KILLED.—MacNeil, Lt. C. H., Man. R., attd. R.F.C.
MISSING.—Godard, Lt. J. S., Eng., attd. R.F.C.

* * *

CASUALTIES AMONG N.C.O.'S AND MEN.
THE DATES ARE THOSE OF THE OFFICIAL LIST

DIED OF WOUNDS.

OCT. 27th.—R.F.C.—Gadd 4646 1st Class Air Mech. J. T. (Birmingham).

DIED.

OCT. 26th.—R.F.C.—Creber 6180 1st Class Air Mech. S. (Swindon); Moon 18772 1st Class Air Mech. W. E. (Kentish Town, N.W.)

WOUNDED.

OCT. 26th.—R.F.C.—Andrews 66941 2nd Class Air Mech. H. (Templecombe); Court 27332 2nd Class Air Mech. A. T. J. (East Finchley, N.); Hall 31725 2nd Class Air Mech. B. L. (Warrington); Johnson 56087 2nd Class Air Mech. W. H. (Deptford, S.E.); Moy 57248 2nd Class Air Mech. C. (Pimlico, S.W.); Sandwell 58569 2nd Class Air Mech. P. H. (Leigh-on-Sea).
R.F.C., attd. R.F.A.—Hadgraft 44982 2nd Class Air Mech. W. H. (Ilford).
OCT. 27th.—R.F.C.—Chapman 49926 2nd Class Air Mech. L. A. (Clapham, S.W.).

The following reports have been received from various sources :—

PRISONERS OF WAR IN GERMAN HANDS.
OCT. 22nd.—R.F.C.—Bassenger 25052 Cpl. H. G. (Plaistow, E.).
PREVIOUSLY MISSING, NOW REPORTED DIED AS PRISONER OF WAR IN TURKISH HANDS.
OCT. 23rd.—R.F.C.—Ponting 7350 2nd Class Air Mech. D. (New Eltham).

PERSONAL NOTICES.

DEATHS.

BISPHAM.—Lt. David Bispham, R.F.C., aged 19, was killed while flying on the night of Nov. 3rd. After a good flight he was about to land, when the machine fell from a height of about 80 ft.

CAUNTER.—Capt. John Charles Ashford Caunter, the Welch Regt. and R.F.C. (killed in action on Oct. 28th), was only son of Brigadier-General and Mrs. Caunter. He was born in April, 1897, and received his commission in Dec., 1914. In April of this year he reached the rank of Captain, having in the previous month obtained his "wings" in the R.F.C.

CRAFTER.—Lieut. James Crafter, M.C., R.F.C., was reported missing on July 7th. News has now been received that he was killed on that date while flying over the German lines. He was 23 years of age, and the second son killed in the war of Mr. Tom Crafter, the veteran athlete and president of the Blackheath Harriers, of 96, Stondon Park, Forest Hill, S.E. He was the hon. secretary of the Blackheath Lacrosse Club and a member of the Blackheath Harriers, and had represented "Insurance" in the annual Banks, Insurance and Stock Exchange walking match on several occasions. He was also a keen cricketer, swimmer, and water polo player. With his brother Tom he went to France with the 1st Battalion of the London Scottish in September, 1914, and eventually attained the rank of serjeant in the machine-gun section. He was gazetted to the London Regiment, and was awarded the Military Cross. Later he was attached for a short time to the K.R.R.C., and afterwards became a pilot in the R.F.C.

CREMONINI.—Sec. Lt. Henry James Cremonini, R.F.C., who was killed on Oct. 18th, was the only son of Mr. Anthony Cremonini, of Kelvedon, Solihull. He received his early education at Ratcliffe College, Leicester.

EDWARDS.—Capt. D. W. Edwards, M.C., A.S.C., attd R.F.C., who was reported missing on April 6th, is now officially reported killed in action on that date. Capt. Edwards was the younger son of Capt. C. R. Edwards, R.A.M.C., and Mrs. Edwards, and husband of Cicely G. K. Edwards, 42 Powis Square, Bayswater.

EVANS.—Lieut. Bernard Evans, R.F.C., was the third son of Mr. Edwin Evans, J. P., and member of the L.C.C. for the Wandsworth Division, and of Mrs. Evans, of Ravenslea, Wandsworth Common. He was one of four brothers, three of whom voluntarily enlisted soon after war broke out, the fourth being rejected on medical grounds. Mr. Evans was educated at Marlborough, and subsequently at Trinity College, Cambridge, where he graduated B.A. and LL.B. At the time of enlisting he was a practising solicitor at Stangate House, Westminster Bridge Road, S.E. Later he became a lieutenant in the Middlesex Regt., and subsequently volunteered for the R.F.C. On Easter Sunday last, April 8th, he went up with a small squadron on a bombing expedition, and was surrounded by a much larger number of enemy machines and killed. He leaves a widow.

GRIFFITH.—A verdict of "Death by misadventure" was returned at an inquest at Dartford on Nov. 5th on the body of Capt. Henry Hall Griffith, R.F.C., who was killed on Nov. 2nd. The evidence showed that he went up with a serjeant for the purpose of testing the engine of an aeroplane, and after ascending to a height of 800 ft. he looped the loop. The machine fell on a barge which was being towed up the Thames. Capt. Griffith was instantly killed, and the serjeant was seriously injured.

Capt. Griffith was second son of Mr. and Mrs. Arthur Foster Griffith, of 59, Montpellier Road, Brighton, and was articled as a solicitor's clerk to his father. He was a member of Christ's College, Cambridge, and was gazetted Flight Commander in August of this year.

HUDSON.—Sec. Lieut. Leslie Sidney Hudson, Gloucestershire Regt., attd. R.F.C., younger son of Mr. and Mrs. Sidney Hudson, was accidentally killed while flying on Oct. 27, aged 20 years. He was educated at the Imperial Service College and Newton College, and joined the Forces in August, 1914, at the age of 17.

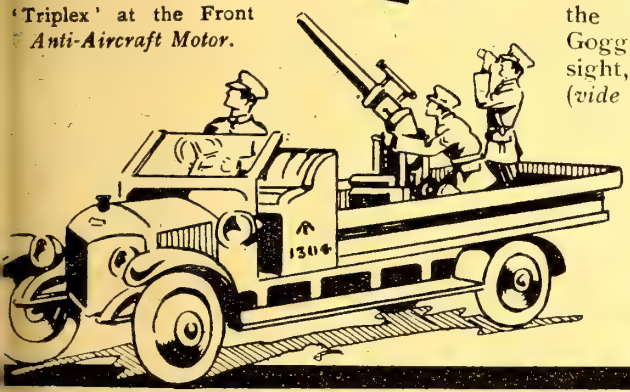
JOHNSTON.—Lieut. Andrew Johnston, R.F.C., who died of wounds on Oct. 30th, was the youngest son of the late Fowel Buxton Johnston. He was 20 years of age.

KEIR.—Lieut. Edward Hugh Keir, R.F.C., was the elder son of Mr. Samuel Keir, secretary of the Royal Albert Institution, Lancaster, the well-known Lancashire chess player and former Yorkshire journalist. He was educated at Lancaster Royal Grammar School, and joined the Forces in 1914, securing a commission

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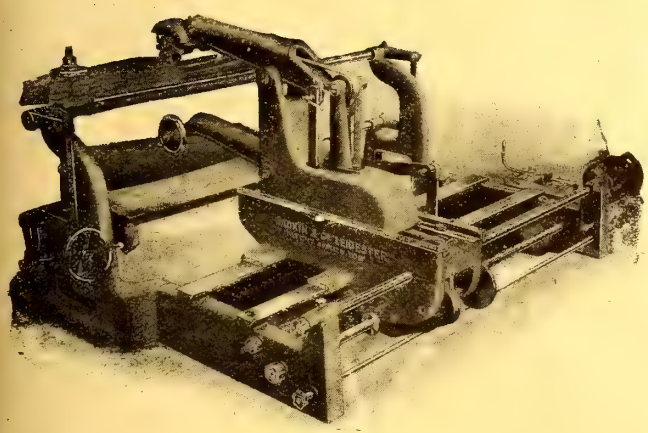


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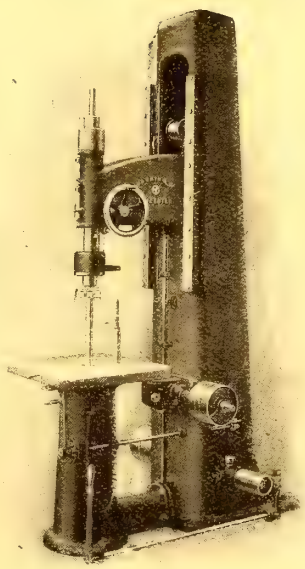
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from the O.T.C. of Lancaster Grammar School in the Royal Lancaster Regt. For some time he was on the staff of a school of instruction, and was transferred to the R.F.C. He had been at the front for three months, and was killed after a gallant fight on Sunday, Oct. 28th.

McKENNA.—Lieut. Justin McKenna, R.F.C., previously reported missing, is now stated to have been killed. He was the son of Mr. Theodore McKenna and a nephew of the Right Hon. R. McKenna, M.P. The gallant officer had great artistic talent, and as a satirical draughtsman had already had a hand in two publications, the last of which, the "Hun-Hunters," was published a few months ago. He met his death in one of his first flights in France.

McNEILL.—A verdict of accidental death was returned on the body of Lieut. C. H. McNeill, Canadian Contingent, attd R.F.C., at an inquest held on Oct. 30th at a village in Norfolk.

MILLS.—Lt. George Carlton Mills, R.F.C., aged 25, was flying in South Hampshire on Nov. 4th, when, at about a height of 500 ft., his machine came into collision with another aeroplane piloted by Capt. Horsley. Mr. Mills's machine crashed to the ground, and he was picked up dead. Capt. Horsley landed safely.

PRINCE-SMITH.—Lt. Donald St. P. Prince-Smith, Royal Dublin Fusiliers, attached R.F.C., who was killed in action on Oct. 24th, was the only son of W. A. Prince-Smith, Allahabad, India, and husband of Peggy Prince-Smith, The Bungalow, Kilcool, Co. Wicklow, Ireland.

SMITH.—A verdict of "Death by misadventure" was returned at an inquest at Napsbury on Nov. 5th on the body of Sec. Lt. Leonard Hale Smith, Essex Regt., attached R.F.C., aged 23, who was killed while flying on Nov. 2nd. His passenger, Lt. Douglas Bell, was not killed, as the machine only fell 50 ft.

WAKEMAN.—Lt. Frank Trevor Wakeman, Royal Warwickshire Regt. and R.F.C., was killed on October 30th, in his 20th year. He was the eldest son of Mr. and Mrs. Frank J. Wakeman, of The Dene, Bushey, Herts, and was educated at Cambridge House School, Margate, and West Buckland School, North Devon. He joined the Artists' Rifles in April, 1915, and was gazetted a second lieutenant in the Royal Warwickshire Regt. in October of that year. He went to France in the following December, and was severely wounded in February, 1916. After six months in hospital and convalescent home he rejoined his regiment, and was shortly afterwards transferred to the R.F.C. He spent the winter of 1916-17 in Egypt, and on returning to this country in May he obtained his "wings" and in the same month went to the front. He was promoted to lieutenant in July, in which month he was again wounded. His flight commander speaks of him as a valuable pilot.

WASEY.—Capt. Cyril Walter Carleton Wasey, Royal Warwickshire Regt., attd. R.F.C., who was killed on Oct. 28th, was the eldest and only surviving son of Mr. and Mrs. G. K. Wasey, of Leigh Hill, Savernake Forest. He was born in 1893, and was educated at Eton and Sandhurst. He joined the Royal Warwick Regt. in March, 1913, and went to France with the Expeditionary Force in August, 1914. He was twice wounded. He was awarded the Legion of Honour for gallantry during the retreat from Mons, and was mentioned in one of Lord French's dispatches. He joined the R.F.C. last summer, and, after completing his course as an observer, had only been back at the front about six weeks.

His C.O. writes:— "I never met a more splendid or stout-hearted fellow. He was a thorough sportsman all through, and afraid of nothing. He has done splendid work for me, but it will be as a friend I shall miss him most."

WHITE.—Lieut. Ronald John Saxton White, Canadian Infantry, attd. R.F.C., who died on Oct. 27th, 1917, abroad, of septic poisoning following wounds, was the youngest son of Mr. and Mrs. William Henry White, late of Charlwood Park, Surrey. He was 25 years of age.

WHITFIELD.—Sec. Lieut. Lewis Hayes Whitfield, R.F.C., who died of wounds on Oct. 30th, was the elder son of Lewis L. Whitfield, of 1, Great Winchester Street, E.C. He was 19 years of age.

WHYTEHEAD.—Sec. Lieut. Hugh Holtom Whytehead, R.F.C., whose death was announced last week, was educated at St. Ninian's, Moffat, and Shrewsbury, where he shot for the school at Bisley. He entered Birmingham University as a student of oil mining in 1913, but joined the Army as soon as war broke out as a private in 5th North Staffordshire Regt. He obtained a commission in 9th North Staffordshire Regt., and served in France some months. Afterwards he served as a motor dispatch rider, then joined the R.F.C., and went out to the Front as a pilot on June 23rd last. He went over the lines with a patrol on July 12th. He and another pilot failed to return, and since then news has been received from a prisoner in Germany that he was brought down dead on that day.

The body of an officer of the R.F.C. has been landed at Dover from a destroyer, having been recovered from the wreckage of an aeroplane in the Channel. The wrecked machine has since been towed in.

Engagements.

LONG—BLACK.—The marriage between Lt. Philip J. Long, R.F.C., son of Brigadier-General A. Long, C.B., C.M.G., D.S.O., and Eleanor Stuart Black, daughter of the late John Stuart Black, of Ditton Hill, Surrey, and of Mrs. Stuart Black, will take place at All Souls', Langham Place, on Nov. 12th, at 1.30. There will be no invitations, but friends will be welcome at the church.

MUSSON—HUTTON.—The marriage of Sec. Lieut. J. M. Musson, R.F.C., and Miss Moya Hutton will take place, quietly, at the Brompton Oratory on Monday, Nov. 19th, at 1.30. Owing to recent bereavement in the bride's family, there will be no reception, but all friends will be welcome at the church.

PRITCHARD—HOK.—An engagement is announced between Lt. T. B. Pritchard, R.F.C., youngest son of Mr. M. J. Pritchard, of Kimberley, South Africa, and Olga Cécile, only daughter of Professor Rolf Hok and Mrs. Hok, of 95, Cornwall Gardens.

Marriages.

HARGRAVE—BATSFORD.—On Oct. 31st, at St. Albans, Hertfordshire, Major William Bowen Hargrave, R.F.C., elder son of Lt.-Col. H. J. Hargrave, R.A.M.C., was married to Ethel May, second daughter of the late Mr. W. F. Batsford, of Ilford, Essex.

HUNT—SOAMES.—On Oct. 28th, at Holy Trinity, Marylebone, Sec. Lt. William Ilam Vane Hunt, R.F.C., only son of the late Rev. William Hunt, Rector of Killymard, was married to Muriel, elder daughter of Arthur W. Soames, M.P., 18, Park Crescent, W. 1, by the Rev. H. G. Sprigg, Rector of Emsworth, assisted by the Rev. E. N. Sharpe, rector of the parish.

STEVENSON—HENSON.—On Oct. 31st, at St. Mary's, Harrogate, Capt. D. F. Stevenson, M.C., Yeomanry and R.F.C., youngest son of Lt.-Col. J. Stevenson, B.Sc., F.R.C.S., M.B., Glen Rowan, Doncaster, and the late Mrs. Margaret Stevenson, was married to Janet Mary, younger daughter of the late J. R. Henson, LL.D., and Mrs. Henson, of Hornsea, East Yorks, by licence.

THOMAS—FRANKLEN.—On October 11th, at Slough Bucks, Sec. Lt. Ronald Q. Thomas, R.F.C., was married to Mary Isabella, second daughter of the late Colonel and Mrs Franklen, of Clementstone, Cowbridge, Glamorganshire.

TURNER—FARRAR.—At St. Luke's Church, Chelsea, on Nov. 1st, Major Basil H. Turner, R.F.C., was married to Helen eldest daughter of the late Sir George Farrar, Bart., D.S.O Owing to mourning in both families the wedding was a quie one. The bride was given away by her uncle. She was attended by the Hon. Kitty Lawrence, daughter of Lord and Lady Lawrence and cousin of the bridegroom, and Miss Murie Farrar, sister of the bride.

Births.

LYWOOD.—On Oct. 20th, at 3, Lovaine Row, Newcastle-on Tyne, the wife of Major O. G. W. G. Lywood, Norfolk Regt. and R.F.C.—a daughter.

PAYNE.—On Oct. 26th, at The City of London Hospital E.C., to Ethel, the wife of Capt. James A. Payne, R.F.C.—a son

POLHILL.—On Oct. 26th. at Turnberry, Ayrshire, the wife of Lt. S. F. P. Polhill, R.F.C.—a daughter.

Will any relatives writing to their prisoner sons in the R.F.C very kindly ask for any information of Sec. Lt. E. Seth-Ward Oxfordshire and Bucks. L.I., attd. R.F.C., who was reported missing on Aug. 10th, 1917? News will be gratefully received by Mr. Melville Seth-Ward, Sutmer Court, Chalfont St. Giles Bucks.

* * *

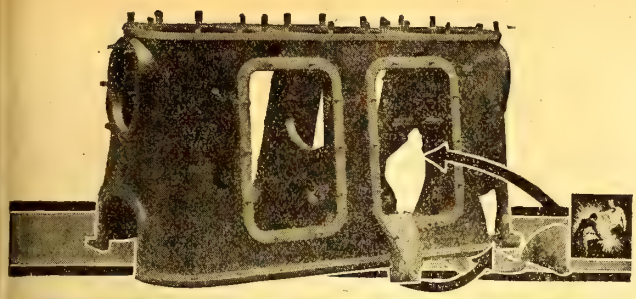
Capt. Laurence Minot, R.F.C., was reported missing on the Western Front, July 28th, 1917. If correspondents of prisoners of war in Germany would kindly ask for news, it would be gratefully received by Mr. J. E. Minot, 30, Beulah Hill, Upper Norwood, S.E.

* * *

Second Lieutenant E. H. P. Streather, R.F.C., was reported missing on Sept. 11th. If any officer or man can give any information, or if relatives of prisoners of war in Germany would ask for news, the information would be gratefully received by Mr. Streather, D'Arcy House, Finchley-road, Golder's Green N.W.4.

* * *

An aeroplane in the charge of Lt. W. F. King and Lt. Cosgrove, of the R.F.C., was flying over Hounslow about noon on Nov. 3rd when it descended out of control, and fell on the heath between two hospital huts, in which were many patients. The machine burst into flames, and in a few minutes was completely destroyed. One of the huts was set on fire, but the



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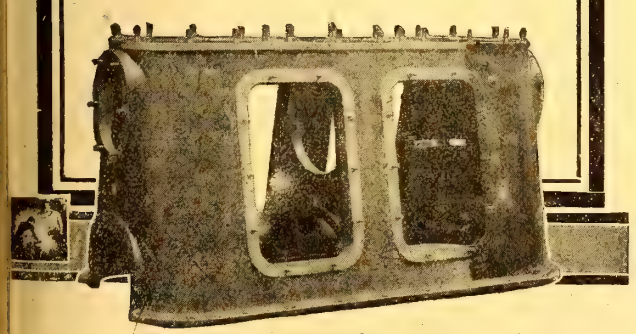
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flames were extinguished by the local fire brigade before any material damage was done.

* * *

Information has been received that Lt. Duncan MacRae, Seaforth Highlanders, attd. R.F.C. (Lord of the Manors of Fornham St. Genevieve and Fornham St. Martin, Suffolk, under the will of the late Sir William Gilstrap, Bt.), only son of Col. and Mrs. MacRae-Gilstrap, of Eilean Donan, Ross-shire, and Ballimore, Argyll, who has been missing for some time, is a prisoner with his observer, Lt. Blake, R.F.C. Both were reported by the Turks to be unwounded.

FRANCE.

Official Communiqués.

Oct. 30th.—During Monday night hostile aircraft dropped bombs on Nancy and the region to the north. One person was wounded. The damage was insignificant.

During the night of the 29th German aeroplanes bombarded Dunkirk and Calais without causing loss of life among the population.

During the same night several bombs were dropped on Belfort. Three persons, including a woman and a child, were wounded. This afternoon St. Dié, about 45 miles north of Belfort, was also bombed, one person being injured.

Four German aeroplanes were brought down by our pilots and twelve were obliged to land in a damaged condition on the 27th, 28th, and 29th inst.

Last night our bombing aeroplanes dropped 2,000 kilogrammes (about two tons) of explosives on the railway stations and depôts at Lichterfelde and Git, in Belgium. In addition, the railway stations of Maizières les Metz, Longueville les Metz, Thionville, etc., received 7,000 kilogrammes (about seven tons) of projectiles. A big fire broke out in the station of Maizières.

Oct. 31st.—During the day of October 30th six enemy aeroplanes were brought down by our pilots. Four others fell in a damaged condition in their own lines.

During the night of Oct. 30th our bombarding squadrons dropped 7,700 kilogrammes (nearly eight tons) of projectiles and explosives on the railway stations of Thionville, Bettembourg, Maizières-les Metz, Longeville-les-Metz, Woippy, and Conflans, as well as on the railway stations of Luxemburg. All the objectives were hit.

Enemy aeroplanes last night dropped about 30 bombs on Dunkirk. Up to the present no casualties or damage are reported.

Nov. 1st.—Some enemy aeroplanes bombarded Calais during the night of October 29th, and Dunkirk on the night of the 31st. Only slight damage was done. There were no casualties among the civilian population.

Nov. 2nd.—Yesterday (November 1st) two aeroplanes were brought down by our pilots and a third by our special guns. In addition seven enemy machines were forced to land in a damaged condition.

Our bombing squadrons copiously sprinkled with bombs the railway station at Mülheim (on the Rhine, below Cologne), the Schlettstadt (north of Colmar) aerodrome, the ammunition depots at Rufach (south of Colmar) and Wepereimphal, and the railway station at Thionville (Diedenhofen, north of Metz).

As a reprisal for the bombing of Dunkirk 17 of our aeroplanes dropped 2,500 kilograms (2½ tons) of bombs on the town of Offenburg, Grand Duchy of Baden (south-east of Strassburg).

Nov. 3rd.—In the period between Oct. 21st and Oct. 31st 23 German aeroplanes were brought down, 21 by our pilots and 2 by the fire of our anti-aircraft guns. In addition, 28 enemy machines were seriously damaged and brought down in their own lines.

During the battle of Malmaison our aviators, with the greatest daring, attacked the enemy's troops with machine-gun fire, bombarded the railway stations and points of assembly, and fought 611 aerial combats.

Sixteen German aeroplanes were brought down, and three captive balloons set on fire. In addition, 50 enemy aeroplanes fell in their own lines, the majority of them being completely destroyed.

Nov. 4th.—During the evening of the 3rd inst. the region of Dunkirk received several bombs from aeroplanes. There were no casualties.

GERMANY.

Official Communiqués.

Nov. 2nd.—Our aviators successfully attacked London and English coastal towns on the night of October 31st-November 1st.

Nov. 3rd.—During last few days our battle aviators have increased the number of their aerial victories. Lt. Müller put out of action his 32nd opponent, Vice-Serjt.-Maj. Buckler his 23rd, Lt. Böhme his 21st, and Lt. Bongartz his 20th.

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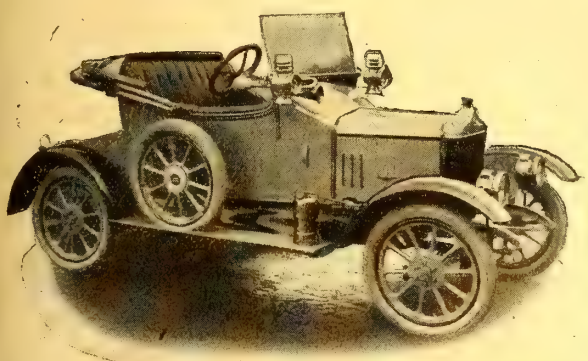
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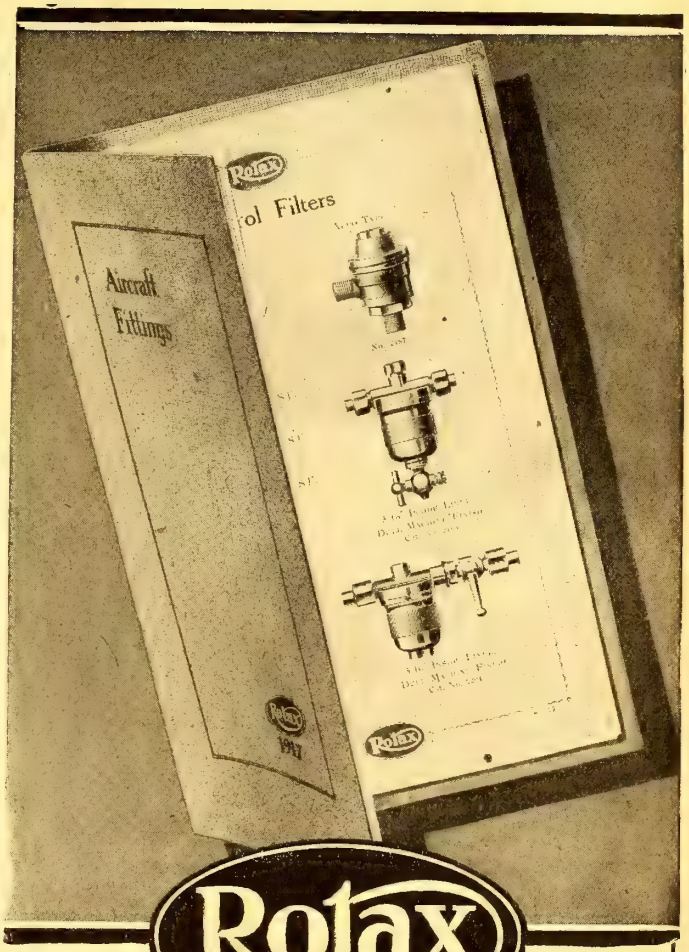
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A message from Amsterdam states that one of Germany's best-known aviators, Lt. Gontermann, was killed on Nov. 3rd at Siegen aerodrome while trying a new machine. He had been decorated with the order Pour le Mérite, and had accounted for 39 Allied machines.

* * *

The "Frankfurter Zeitung" reports that at 3.30 p.m. on Nov. 1st six enemy aviators, coming from the west, appeared over Kaiserslautern and dropped several bombs, without, however, causing any loss of life or material damage.

The same day, the journal adds, enemy aviators bombed Offenburg (to the south-east of Strassburg) and its environs. There were no casualties at Offenburg and only unimportant material damage is reported. Two persons were killed and several injured at Schutterwald, south-west of Offenburg.

* * *

A telegram from Pirmasens (Bavaria) to the "Frankfurter Zeitung," says a Reuter's message from Amsterdam on Nov. 1st, reporting an enemy air raid, says that bombs were dropped on the town and environs. The casualties were one person killed and four wounded. Some material damage was done.

RUSSIA.

Official Communiqués.

Oct. 31st.—On Oct. 28th our aviators dropped eight poods of bombs on enemy stores in the Borki-Wielkie (east-south-east of Tarnopol) region. On Oct. 29th, in the region of Okna, Bukovina), an enemy aeroplane, after being damaged, was brought down in the enemy's lines.

Enemy aviators, without causing damage, dropped 20 bombs on the station of Malinovka, sixteen miles north-east of Dvinsk.

Nov. 3rd.—In the Stechnikowce sector, six miles north of Tarnopol, one of our machines was damaged by the enemy's artillery fire, and was forced to descend in the enemy zone. Our infantry, however, saved the machine and its aviator

Nov. 4th.—On the South-Western Front, in the direction of Kamen-Kashirsk, on Oct. 31st, our aviators dropped eight poods (2 cwt.) of bombs on Polizy Farm, causing a fire to break out. In the region of the village of Solomno, twelve miles south-west of Volochisk, an enemy aeroplane, having lost its way, alighted in the rear of our position. The aviator, a commissioned officer, was taken prisoner.

ITALY.

Official Communiqués.

Nov. 1st.—Our troops have effected the withdrawal on the Tagliamento in spite of extremely difficult strategical and terrain conditions. The untiring aviators are worth being mentioned to the admiration and gratitude of the country.

Last night enemy aeroplanes brutally bombed several unprotected towns far from the lines of communication, causing a few casualties amongst the civil population.

Nov. 4th.—Yesterday two German aeroplanes were brought down by our aviators at Oderzo (20 miles west of the Tagliamento) and Codroipo.

Nov. 5th.—On the night of Nov. 3rd-4th and yesterday our aeroplanes and airships effectively bombed the hostile troops in the basins of Caporetto (Isonzo, nine miles above Tolmino) and Tolmino and along the left bank of the Tagliamento.

During Nov. 3rd besides the two machines already mentioned yesterday, our aviators brought down three more enemy aeroplanes, one of which fell in the vicinity of Caldonazzo (Trentino) and the other two in the Lagoon of Grado (Isonzo delta).

* * *

A Reuter's message, published on Oct. 31st, says that for weeks past the Austrians have been inundating the Italian lines with bombs filled with leaflets. Immense numbers of pamphlets and all kinds of literature were dropped from aeroplanes, and great quantities of pictures pretending to show that Italy was under the thumb of Great Britain and France were distributed broadcast.

Further propaganda has included the fiction that the people of Italy are ready for a rising, and the soldiers were strongly recommended to follow the example of the Russian troops, and then make a separate peace. The presence of Allied troops in Italy will, it is felt, have a great effect in counteracting this propaganda, and will itself prove the falsity of the enemy's statements.

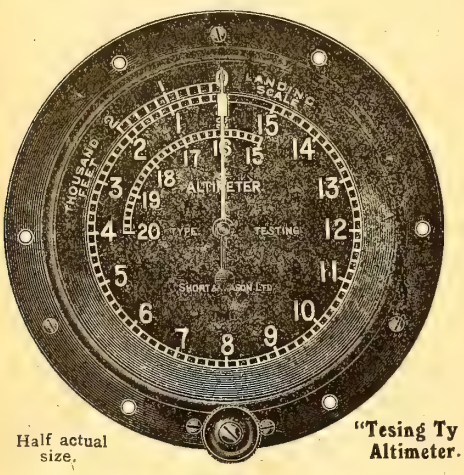
TURKEY.

Official Communiqués.

Nov. 3rd.—Of the five enemy aviators who dropped bombs on Kifri, in Mesopotamia, "three were brought down by our artillery fire."

Nov. 4th.—In Syria two out of five enemy aeroplanes, which unsuccessfully bombed Haifa, fell into the sea as a result of damage. The wrecked machines sank after the occupants had been rescued by an enemy monitor.

Sinai Front.—A British captive balloon, which had broken loose, was shot down over Askalon.



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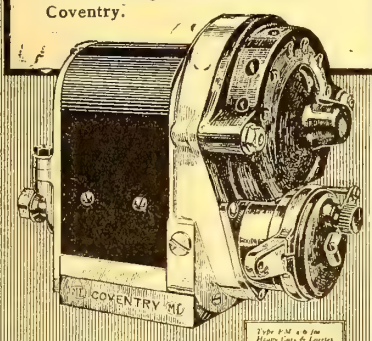
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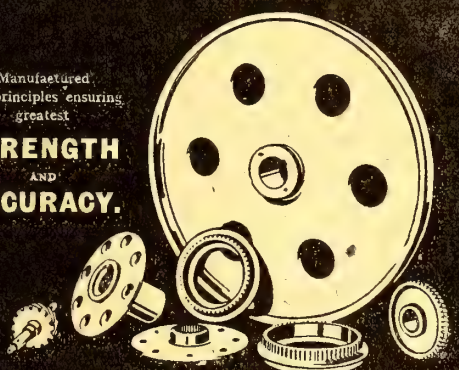
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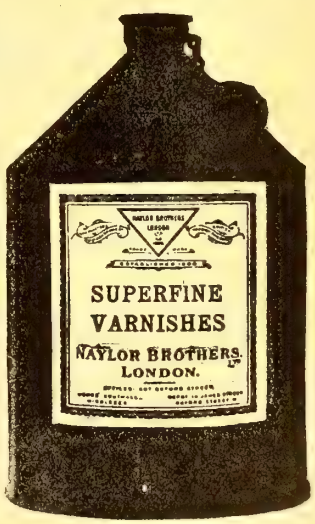
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BULGARIA.

OFFICIAL COMMUNIQUE.

Oct. 29th.—On the west bank of the Struma, near Kopriva, Lt. Eschwege brought down a captive balloon, which fell in flames behind the enemy lines. This is his seventeenth aerial victory.

BELGIUM.

OFFICIAL COMMUNIQUÉ.

Nov. 6th.—Our aircraft were very active yesterday. Adjutant de Meuleneester brought down his sixth machine.

SWITZERLAND.

"La Suisse" (Geneva, Nov. 2nd) states that a Zeppelin flew over Rorschach, and, when fired at by the Swiss, disappeared to the south, while two hours later a squadron of four Zeppelins was seen travelling towards Tyrol. Their destination is believed to be the Italian front.

An enormous Zeppelin, just completed at Friedrichshafen, made its first trial over Lake Constance on Nov. 1st, in the presence of the King of Würtemberg.

HOLLAND.

The "Telegraaf" (Amsterdam) reports that a German aeroplane descended at a short distance from Holten on Oct. 31st. The occupants were a naval officer and a non-commissioned officer, who set the machine on fire on landing. They were arrested by a sentry and taken to Deventer.

SWEDEN.

The "Morning Post" correspondent at Stockholm writes on Oct. 24th as follows:—

The Swedish Aeronautical Club is now engaged in taking active measures for the realisation of its long contemplated air service between Stockholm, Malmö, and Gothenburg. There are to be fourteen intermediate stations, for the erection of which the necessary land has already been partly acquired.

The service, it is expected, will be opened before the end of the war.

DENMARK.

A young Danish aviator, the parents of whom live in Perth, Australia, has been shot down by the Germans. The Scandinavian

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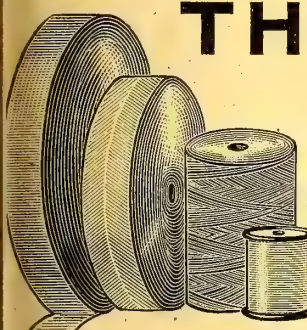
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paper in Australia, "Norden," writes in its last issue:—As our readers will remember from a note appearing in "Norden" at the end of March last, the young Mouritzen had been trained as an aviator in England, and was, after only nine months' training, appointed lieutenant in "The Imperial Flying Corps." Now, he had been sent up to chase some German aviators away invading Essex, and here he met his fate.

The sympathetic Roy Mouritzen was only 20 years old. He was a son of the Dane, C. F. Mouritzen, well known in Perth.



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U.S.A.

On Sept. 19th, Cadet Caleb Bragg, U.S. Army Air Service, flew at Hazelhurst Field to an altitude of 22,000 feet, thus breaking the American altitude record. The machine was a 150-h.p. Wright-Martin model V biplane, with an American-built Hispano-Suiza engine.

* * *

On August 25th a Wright-Martin flying-boat, piloted by a naval officer, and carrying two passengers, reached an altitude of 12,900 feet. This machine also was fitted with an Hispano-Suiza engine.

* * *

From Washington the "New York Sun" learned on Nov. 3rd that aeroplane construction undertaken by the United States has progressed to a stage where it is possible to announce officially that there can be no demands of the American Government or of the Allies which the manufacturing facilities of American plants would not supply. [But what about the designing facilities or abilities?—Ed.]

A MOONLIGHT CHART.

C. A. Vandervell & Co., Ltd., the well-known manufacturers of the C.A.V. motor accessories, have issued a postcard with a cleverly-devised chart compiled by Mr. A. H. Midgley, the firm's chief engineer. This chart shows at a glance the times of sunset and sunrise on every day through the month of November, and also the state of the moon on each of these days.

The chart will doubtless be of considerable interest to those who are accustomed to consult the sun and the moon in fixing theatre dates, etc., and C. A. Vandervell & Co., Ltd., will be pleased to send a copy of the postcard to anyone who applies.

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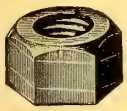
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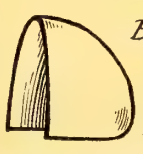
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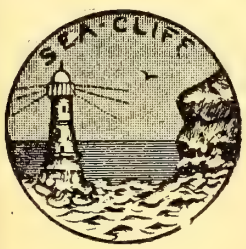
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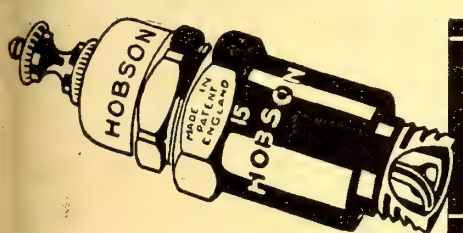
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1360	1 29 M	5 02 M			9½
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	1 29 TU	5 01 TU			9½
32 Hrs	5 59 W 8 29 W				
	1 29 W	3 00 W	32 hrs	7½	
	3 00 W	5 01 W		2	9½
1510	6 00 TH 8 30 TH				
11½ Hrs	1 29 TH	5 00 TH	11½	9½	9½
K.31.	6 00 F	7 00 F		1	
E.53	7 00 F 8 29 F	10 00 F		2½	
1820	10 00 F 1 30 F	4 00 F		5	
1469	4 00 F	5 00 F		1	9½
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Edited by C.G.Grey

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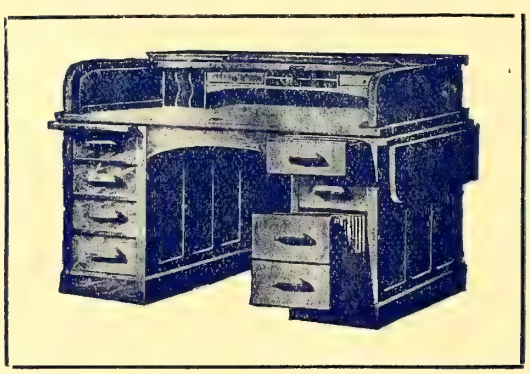
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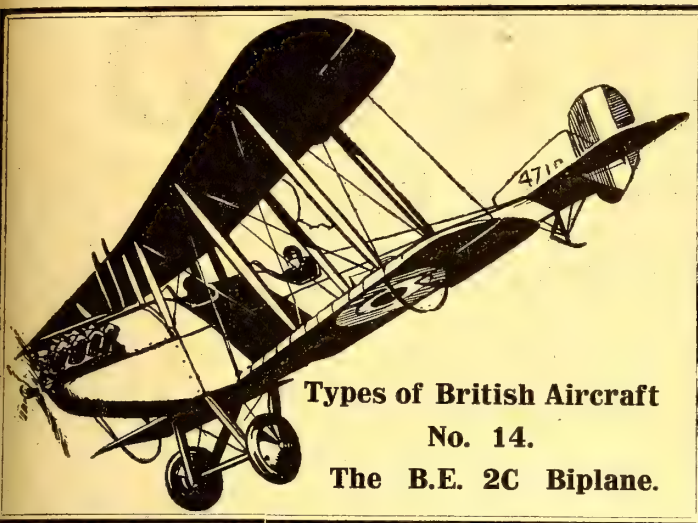
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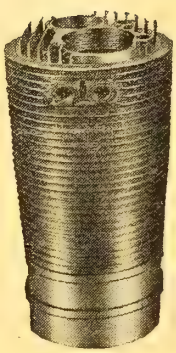
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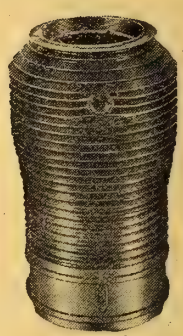
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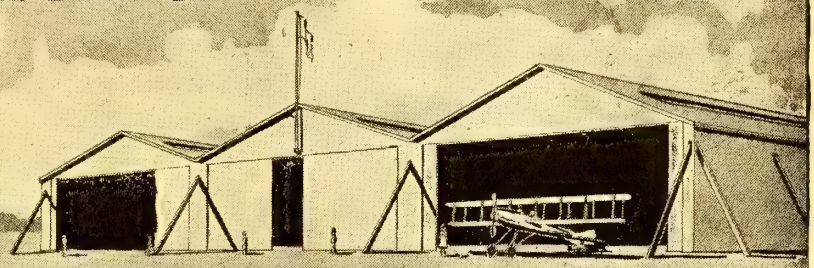
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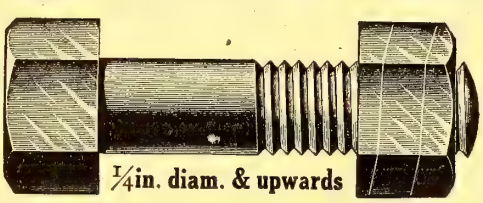
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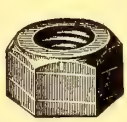
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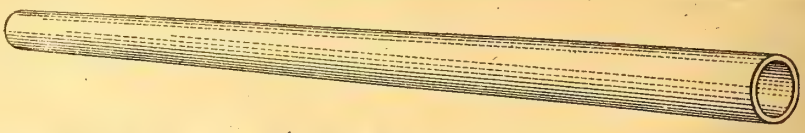


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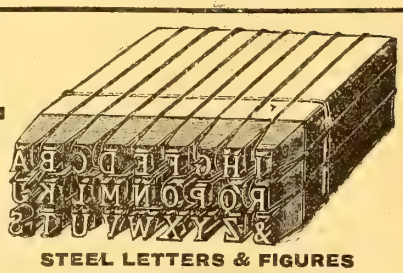
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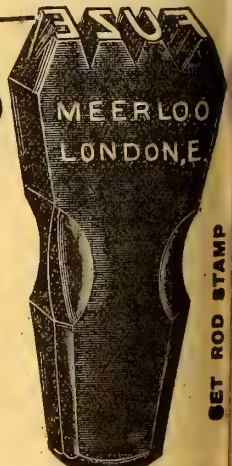
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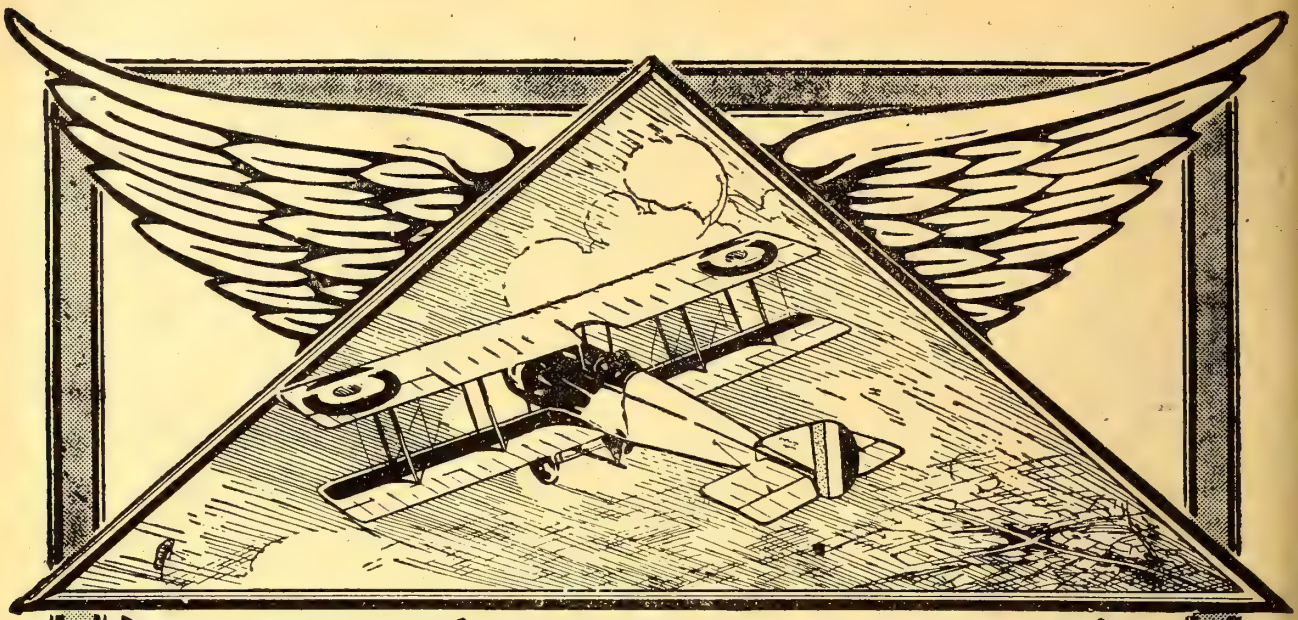
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ON THE AIR FORCE BILL.

On Monday, November 12th, the Air Force Bill, which had passed its first reading on Thursday, November 8th, and was published on November 9th, was put through its second reading. The occasion is of historic moment, for, whether for good or evil, the Bill is to set up a third section of the King's Armed Forces, with a Secretary of State of its own of the first rank. The Bill, as presented, reads as follows:—

A Bill to make provision for the establishment, administration, and discipline of an Air Force, the establishment of an Air Council, and for purposes connected therewith.

Be it enacted by the King's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal and Commons, in this present Parliament assembled, and by the authority of the same, as follows:—

PART I.

ESTABLISHMENT OF AIR FORCE.

1. It shall be lawful for His Majesty to raise and maintain a force, to be called the Air Force, consisting of such number of officers, warrant officers, non-commissioned officers, and men as may from time to time be provided by Parliament.

2.—(1) Subject to the provisions of this Act it shall be lawful for His Majesty, by order signified under the hand of a Secretary of State, to make orders with respect to the government, discipline, pay, allowances, and pensions of the Air Force, and with respect to all other matters and things relating to the Air Force, including any matter by this Act authorised to be prescribed or expressed to be subject to orders or regulations.

(2) The said orders may provide for the formation of men of the Air Force into separate units, and for the formation of such units into corps, and for appointing, transferring, or attaching men of the air force to units, and for posting, attaching, and otherwise dealing with such men within the units, and may regulate the appointment, rank, duties, and numbers of the officers and non-commissioned officers of the Air Force.

(3) Subject to the provisions of any such order, the Air Council hereinafter constituted may make general or special regulations with respect to any matter with respect to which His Majesty may make orders under this section:

Provided that the administration of pensions, other than service pensions within the meaning of the Ministry of Pensions Act, 1916, shall vest in the Minister of Pensions.

(4) All orders and general regulations made under this section shall be laid before Parliament as soon as may be after they are made.

3.—(1) Any officer, warrant officer, petty officer, non-commissioned officer, or man of any of His Majesty's naval or military forces, may, with his consent and subject to the approval of the Admiralty or Army Council (as the case may be), be transferred by the Air Council to the Air Force, or attached by the Air Council to the Air Force for the period of the present war or for a period not exceeding four years:

Provided that—

(a) any officer, warrant officer, petty officer, non-commissioned officer, or man who at such date as may be fixed by Order in Council belongs or is attached to the Royal Naval Air Service, the Royal Flying Corps or any unit of the naval or military forces engaged in defence against aircraft which is designated by the Admiralty or Army Council for the purpose, may be so transferred or attached, without his consent, but if any person so transferred or attached, within three months from the time when he receives notice of such transfer or attachment or such longer period as in any particular case the Air Council may allow, gives notice to his commanding officer that he does not desire to be so transferred or attached, the transfer or attachment shall be annulled without prejudice to the validity of anything which may have been done in the meanwhile; and

(b) no person transferred to the Air Force under the provisions of this section shall be liable to serve with the Air Force for any longer period than that for which he would have been liable to serve had he continued in the force from which he was transferred.

(2) Regulations made by the Air Council may provide that in the case of a person so transferred, the time during which he held a commission or served in the force from which he is transferred shall, for such purposes as may be prescribed, be aggregated with the time during which he holds a commission or serves in the Air Force, and that his entry into or enlistment in the force from which he is transferred shall, for such purposes as may be prescribed, be treated as enlistment into the Air Force.

(3) When any person is transferred to the Air Force under this section, then for the purposes of pay, pensions, gratuity, and retired or half-pay, and of any decoration or reward dependent on length of service, any previous service with His Majesty's naval or military forces which would have counted as service towards pay, pension, gratuity, retired or half-pay, or such decoration or reward if he had not been so transferred, shall be deemed to be service with the Air Force towards pay, pension, gratuity, retired or half-pay, or such decoration or reward.

(4) Where any person is attached to the Air Force under this section, the fact that he is so attached shall not affect any right to any pay, pension, gratuity, retired, or half-pay, or such decoration or reward as aforesaid, already earned by him in that branch of His Majesty's naval or military forces to which he belonged at the date on which he was so attached, and the period during which he is so attached shall, for the purpose of any provisions relating to pay, pensions, gratuity, retired, or half-pay, or such decoration or reward, be deemed to be service with that branch of His Majesty's naval or military forces to which he belonged at the date on which he was so attached.

4. Officers in the Air Force shall enjoy all such powers, rights, immunities, and privileges as are enjoyed by commissioned officers of His Majesty's Navy or Army as such, whether conferred by statute or otherwise, and the acceptance of a commission in the Air Force shall not render a person accepting such a commission incapable of being elected to or sitting or voting in the Commons House of Parliament, and nothing in the Succession to the Crown Act, 1707, shall extend to any member of the Commons House of Parliament who, being an officer of the Air Force, receives any new or other commission in the Air Force, or receives a commission in His Majesty's Navy or Army, or who, being an officer in His Majesty's Navy or Army, receives a commission in the Air Force.

5.—(1) Any men who, by virtue of the Military Service Acts, 1916 and 1917, are deemed to have been enlisted in His Majesty's regular forces and to have been transferred to the reserve, or who having voluntarily enlisted in the regular forces have been so transferred, shall on being called up for service be liable to be transferred to the Air Force.

(2) There shall be included amongst the exceptions mentioned in the First Schedule to the Military Service Act, 1916, the following:—

Men serving in the Air Force.

6.—(1) It shall be lawful for His Majesty to raise and maintain an Air Force Reserve and an Auxiliary Air Force consisting in each case of such number of officers, warrant officers, non-commissioned officers, and men as may from time to time be provided by Parliament, and to provide for the transfer or

attachment to the Auxiliary Air Force, subject to the consent, officers and men of any unit of the territorial force which at the passing of this Act forms part of the Royal Flying Corps.

(2) His Majesty may, by Order in Council, apply with the necessary adaptations to the Air Force Reserve, or to the Auxiliary Air Force, or to the officers or men of any such force, any enactment relating to the Army Reserve or to the Territorial Force or to the officers or men of those forces, and such Order in Council shall be laid before both Houses of Parliament.

7. The amendments set out in the second column of the tables in Part I and Part II of the First Schedule to the Act (being amendments consequential on the establishment of an air force) shall be made in or inserted after the provisions of the Naval Discipline Act and the Army Act respectively mentioned in the first column of those tables, and section two of the Naval Discipline Act, 1917 (which relates to the printing and construction of the Naval Discipline Act), shall apply by the amendments of the Naval Discipline Act made by this Act in like manner as it applies to the amendments thereof made by that Act.

PART II.

ESTABLISHMENT OF AIR COUNCIL.

8.—(1) For the purpose of the administration of matters relating to the Air Force and to the defence of the realm by air there shall be established an Air Council consisting of one of His Majesty's Principal Secretaries of State who shall be President of the Air Council and of other members who shall be appointed in such manner and subject to such provisions as His Majesty may by Order in Council direct.

(2) His Majesty may by Order in Council fix the date as on which the Air Council is to be established, and make provision with respect to the proceedings of the Air Council and the manner in which the business of the Council is to be distributed among the members thereof.

(3) On the establishment of the Air Council the Air Board constituted under the New Ministries and Secretaries Act, 1916, shall cease to exist, and all the powers, duties, rights, liabilities, and property of that Board shall be transferred to the Air Council, but nothing in this subsection shall affect any orders, instructions, or other instruments issued by the Air Board, and all such instruments shall have effect as if issued by the Air Council.

(4) His Majesty may by Order in Council transfer from the Admiralty, or from the Army Council or the Secretary of State for the War Department, to the Air Council or the President of the Air Council such property, rights, and liabilities of the Admiralty or Army Council or Secretary of State as may be agreed between the Air Council and the Admiralty or the Army Council, as the case may be.

9.—(1) The Air Council may appoint such secretaries, officers, and servants as the Council may, with the sanction of the Treasury, determine.

(2) There shall be paid, out of moneys provided by Parliament, to the members of the Air Council, and to the secretaries, officers, and servants of the Council, such salaries or remuneration as the Treausry may determine.

10.—(1) The Air Council may sue and be sued, and may for all purposes be described by that name.

(2) The Air Council shall have an official seal, which shall be officially and judicially noticed, and that seal shall be authenticated by the signature of the President, or of a secretary, or of some person authorised by the Council to act on behalf of a secretary.

(3) Every document purporting to be an instrument issued by the Air Council, and to be sealed with the seal of the Council, authenticated in manner provided by this Act, or to be signed by a secretary or any person authorised by the Council to act on behalf of a secretary, shall be received in evidence, and be deemed to be such an instrument without further proof, unless the contrary is shown.

(4) A certificate signed by the President of the Air Council that any instrument purporting to be made or issued by the Council was so made or issued shall be conclusive evidence of the fact.

(5) The Documentary Evidence Act, 1868, as amended by the Documentary Evidence Act, 1892, shall apply to the Air Council as if that Council were mentioned in the first column of the schedule to the first-mentioned Act, and as if the President, or a secretary of the Council, or any person authorised by the President to act on behalf of the Council, was mentioned in the second column of that schedule.

11.—(1) The number of Principal Secretaries of State and Under Secretaries capable of sitting and voting in the Commons House of Parliament shall be increased to five, and accordingly section four of the Government of India Act, 1858, and section one of the House of Commons (Vacation of Seats) Act, 1864, shall have effect as if the word "five" was substituted for the word "four" wherever that word occurs in those sections:

Provided that nothing in this provision shall affect the operation of section nine of the New Ministries and Secretaries Act, 1916, so long as that section continues in force.

(2) In addition to the Under Secretary of State one of the Secretaries to the Air Council shall not by virtue of his office be incapable of being elected to or of voting in the Commons House of Parliament.

PART III.

DISCIPLINE, &c.

12.—(1) The Army Act as in force immediately before the passing of this Act shall, subject to the modifications set out in the Second Schedule to this Act (being amendments required to adapt that Act to the circumstances of the Air Force) apply with respect to the Air Force, and shall, as so modified, take effect as a separate Act of the present session of Parliament, and may be printed as a separate Act by the printers to His Majesty and intituled "An Act to provide for the Discipline and Regulation of the Air Force," and that Act may, subject to any modifications which may from time to time be made therein, be cited as the Air Force Act:

Provided that for the purposes of section eighty-eight of the Air Force Act (relating to the continuance of men in air-force service in case of emergency) the proclamation issued under section eighty-eight of the Army Act on the outbreak of the present war shall have effect as if it had been issued under the first-mentioned, as well as the last-mentioned, section, and had applied to the Air Force as well as to the Army.

(2) The Air Force Act shall continue in force only as long as the Army Act continues in force.

(3) Where by any enactment passed after the passing of this Act any amendments are made in the Army Act the corresponding amendments shall be made in the Air Force Act, subject to such modifications and exceptions as His Majesty in Council may declare to be necessary for adapting the same to the Air Force.

(4) Where by an enactment passed after the passing of this Act and for the time being in force any enactments or words are directed to be substituted in the Army Act or the Air Force Act for any other enactments or words, or to be added to or omitted from the Army Act or the Air Force Act, then all copies of the Air Force Act printed after such direction takes effect shall be printed with the said enactments or words added to the said Act or omitted therefrom, or inserted therein in lieu of any enactments or words for which the same are to be substituted, according as such direction requires, and with the sections and subsections numbered in accordance with such direction, but, as respects amendments to the Army Act, subject to such modifications and exceptions as aforesaid, and the Air Force Act shall be construed as if it had at the time at which such direction takes effect been enacted with such addition, omission, or substitution.

(5) A reference in any enactment passed after the passing of this Act to the Air Force Act shall, unless the context otherwise requires, be construed to refer to the Air Force Act as amended by any enactment for the time being in force.

13.—His Majesty may by Order in Council apply, with the necessary modifications and adaptations, in relation to the Air Council, the President of the Air Council, and the Air Force, and the officers and men thereof, and air force property or institutions, any of the enactment relating to the Army Council, the Secretary of State for the War Department, the Army, or the officers and soldiers thereof (including enactments conferring any powers, rights, exemption, or abatement from taxation or immunities, or imposing any duties or disabilities on such officers or soldiers), or to military property or institutions, and every such Order in Council shall be laid before both Houses of Parliament.

PART IV.

GENERAL.

14.—This Act may be cited as the Air Force (Constitution) Act, 1917.

[Hereinafter follow two Schedules setting forth modifications in the Naval Discipline Act, and in the Army Act, making them applicable to the Air Force. It is unnecessary to print them.—Ed.]

Owing to lack of space, it is necessary somewhat to abridge the debate on the Second Reading, but every effort has been made to omit no essential point put forward in the House of Commons. The following report is based on that which appeared in *The Times* newspaper on November 13th:—

Major Baird, in moving the second reading of the Bill, traced the history of the organisation dealing with aviation matters, and commented upon the tendency which was manifested by the members of the somewhat unwieldy Air Committee to range themselves into two parties—a naval party and a military party. With the enormous extension of the Air Services rendered necessary by active operations competition was bound to take place, and that was bad for both Services.

The Air Board, which would cease to exist when this Bill was passed and the proposed Council was created, had brought the members of the two Services under the same roof, together with the officials of the Ministry of Munitions, who were responsible for supplies, and the officers and everyone concerned had got to know each other and the different methods of the Services, and nothing could be more satisfactory than the ex-

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tremely harmonious relations which prevailed between all branches of the Air Service. Extremely valuable services had been rendered by the Ministry of Munitions. There had been some nervousness at the start lest the transfer to a separate Ministry and organisation of the duty of supplying highly technical things like aircraft and air engines might lead either to delays or to falling behind the times and failing to supply our flying men with the most up-to-date machines. Preparations had to be made to-day, therefore, for what we were to have as to quality and quantity nine months hence. The closest possible co-operation between the designer, the user, and the manufacturer was absolutely essential in this branch of warfare. and that had been secured to an astonishing extent by the Air Board.

Looking at the problem of developing to the utmost extent our aeronautic resources with a view to hitting the enemy hardest from the air as often as we could and as much as we could, there was no doubt that the present system entailed a great deal of divided responsibility. In order to train pilots for whom the Army Council were responsible, the Air Board must supply training aeroplanes, and for this the Air Board were responsible. If there were a shortage of training aeroplanes or engines there would be a shortage of pilots. If there were a shortage of pilots all the efforts of the Air Board to provide more aeroplanes and engines would be wasted. For training pilots new aerodromes were required, and these the Army Council had to provide. If the Department of Fortifications and Works at the War Office should fail to supply the aerodromes, the Military Aeronautical Director of the Royal Flying Corps would fail to supply the pilots, and all the efforts of the Air Board would be wasted owing to a failure quite outside their control or jurisdiction. That is an instance of the difficulty and an example of the need for co-ordination. The duty of the Air Board was to co-ordinate the demands of the Navy and the Army, but unfortunately the Board had no staff to advise on technical matters of that sort. That would be provided by this Bill.

If there were disagreement under present circumstances between the Navy and the Army as to the allocation of aircraft, the dissatisfied officer, be he the Fifth Sea Lord or the Director-General of Military Aeronautics, could appeal to the Army Council, but it said a good deal for the harmony which prevailed at the Air Board that on no single occasion had either of these officers availed himself of that right.

One of the most important needs is a specialised medical service. It had been found by experience that flying men are subject to many peculiar physical disabilities, and research into the methods of prevention and cure of these disabilities has advanced very rapidly. So long, however, as the flying services remain merely as appendages of the Army and Navy, it is very difficult to provide for the study of these medical matters, and for the special treatment of the patient. Knowledge on the subject is limited almost entirely to those few medical officers and civil practitioners who have had considerable numbers of flying men continuously under their care, and it is necessary at once to take special measures to provide separate accommodation for the cases and separate staff to concentrate on the problems which have arisen.

The mere selection of candidates for the flying services has become a highly specialised business, and the standard of fitness required for flying is diverging from the standard required for the ordinary naval and military services. These are only examples of the necessity for securing a body of men whose sole business shall be to concentrate on that particular branch of medical science which is necessary for the welfare of flying men.

Continuing, **Major Baird** said :—

It may be asked whether this change might not have been brought about sooner. I think nobody who has really been in close contact with the flying services would agree that the change could have been brought about sooner. People are apt to forget what the strain is under which the officers and men are working whose co-operation must be used in order to bring about this change. To change a service rendering highly specialised and vital service to the Army and the Navy, such as the Flying Corps of both branches is rendering at present, except by the advice of those who are really competent to judge, would in time of war be extremely dangerous.

Until you had the organisation bringing everybody together, as we have now at the Hotel Cecil, I am perfectly certain it would be quite impossible to have devised a satisfactory scheme without running very great risk of dislocation which might have disastrous effects in the field. We have endeavoured to draw a Bill which will create an Air Force and an authority responsible in air matters by using all the existing machinery so far as it affects our flying men to the utmost extent, with a view to the least possible dislocation and the smallest amount of innovation.

Conditions of Transfer.

Explaining the provisions of the Bill, **Major Baird** said : Subsection (1) of Clause 2 seeks to ensure that pensions which, owing to various acts, are given to soldiers, will go on when they transfer from the Army. Disablement pensions fall within the sphere of the Ministry of Pensions.

Clause 3 is the really important clause, as it refers to the transfer of officers and men from the existing air services into the new force. There are two forms : an officer or a man can either be transferred, in which case he ceases to be a sailor or soldier, and becomes a member of the Air Force, or he may be attached, in which case he is in the position of an officer or man seconded or lent by one service to another. He is very much in the position of an officer of the Army who is seconded for service with the Egyptian Army. It has been thought necessary to secure that men who have engaged for a particular kind of service cannot be forcibly transferred to another kind of service ; therefore it is provided that the transfer can only take place in the first place with the consent of the officer or man, and in the second place with the consent of the Admiralty or the War Office, as the case may be, and obviously with the consent and at the request of the Air Council. The transfer does not affect the term of service. If a man enlisted in the Army for seven years with the Colours, and at the time of his transfer had four years' Army service, he could only be kept in the Air Service three years.

Subsection (3), Clause 3, equally safeguards the right to pay, pension, gratuities, retired and half pay, decorations, and rewards, depending upon length of service which have been earned in the service from which the man has been transferred. Equally when an officer or man is attached to the Air Service the fact that he is so attached shall not affect any right to pay, pension, gratuity, and so on which he has already earned, and he is precisely in the position in which he would be if he joined the Egyptian Army or was seconded or lent for service in any other force. Another subsection enables officers to serve on Courts-martial if they have sufficient Army and Naval service to entitle them to do so, but would not have the necessary service if it were only counted from the date of the transfer.

Clause 4 affects various rights and powers enjoyed by commissioned officers under different Acts of Parliament, and in addition to that certain privileges conferred by common law. They are all safeguarded, and the object is to put officers of the Air Force in precisely the same position as officers of the Army and Navy.

Clause 5 deals with the application of the Military Service Acts. Obviously, the Military Service Acts would not apply to the Air Force unless provision is made. The allocation of men as between the Army and the Air Force is a matter which must be settled by the War Cabinet, and the Ministry of National Service will, in pursuance of general instructions, carry out the allocation. Clause 6 makes it possible to raise a reserve and an auxiliary Air Force. Obviously, in time of war that would be inoperative, but it is necessary to provide in the Bill for time of peace. An amendment is made to the Army Act which will deprive the military authority of the power of requisitioning aircraft. It was not quite obvious to us what they would do with the aircraft, and it was not necessary to put that in.

Clause 8 establishes the Air Council. The President of the Air Council is to be a Secretary of State, and the Secretary of State is, according to constitutional practice and precedent, created under the prerogative of the Sovereign. Therefore, power is not taken in the Bill. The other members of the Air Council will be fixed according to Order in Council very much on the lines of the Army Council, and the Order in Council will allocate their duties. The representative of the Ministry of Munitions will continue to sit as a member of the Air Council, because there is no question of disturbing the admirable arrangement under which aircraft are now supplied by that Ministry. With regard to the other members of the Council, they will be officers charged with duties analogous to those performed by members of the Army Council. The distribution of those duties will be made known and the composition of the Council will be laid down in the Order in Council.

Mr. Joynson-Hicks : May I ask if it is intended to provide that any member or members of the Air Council shall continue to sit one on the Army Council and one on the Board of Admiralty to act as intermediaries?

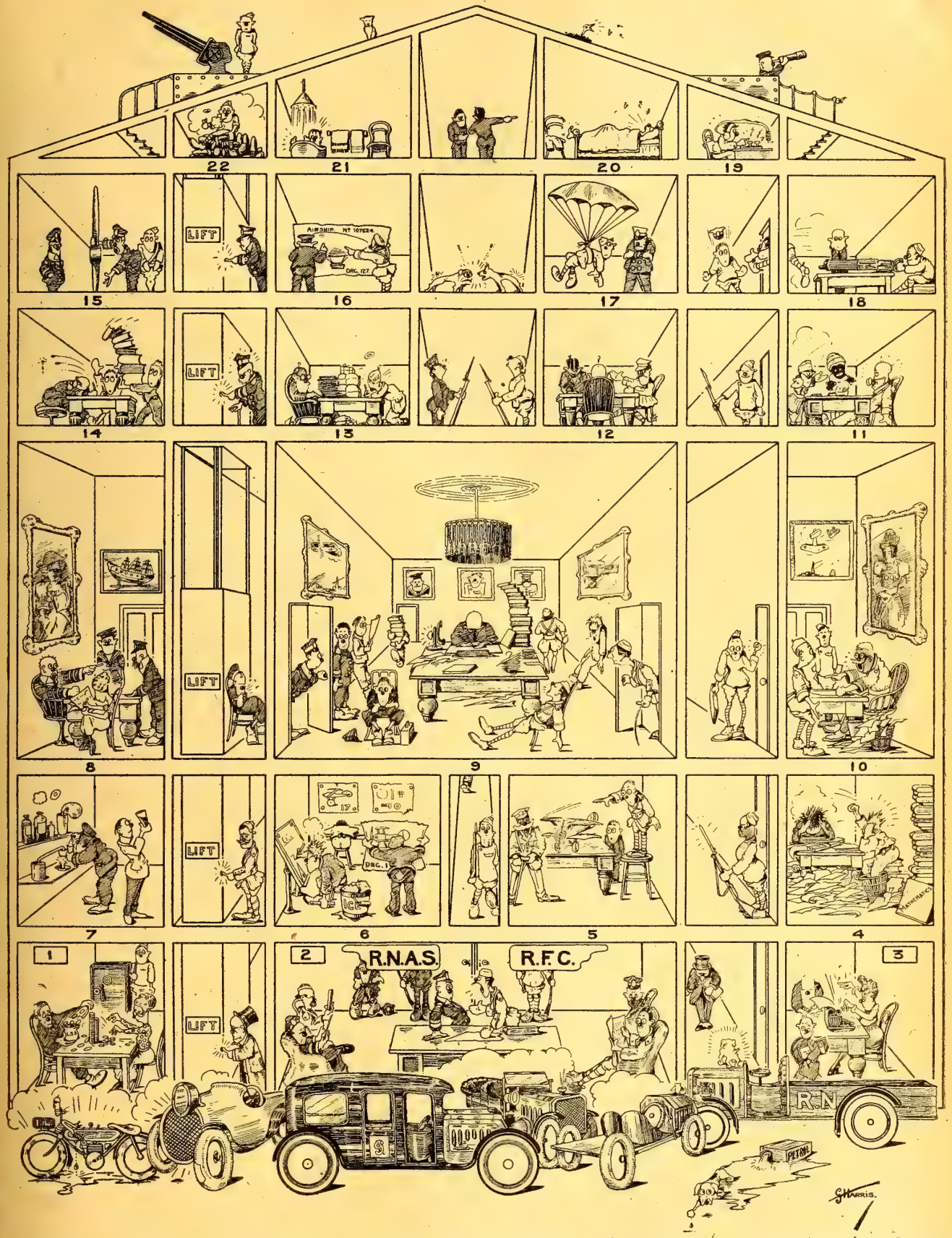
Major Baird : There is no such intention, and for this reason —that when you create a separate Air Force the Army and the Navy will make their demands on the Air Council for their requirements, and the Air Council will then exercise the function now exercised by the Air Board and allocate to the Army and the Navy, not only aircraft, but the whole personnel, and will have to keep up the units, and will be responsible for them. There will be nothing, as far as we know, analogous to the present Department of Military Aeronautics. The Council will take over in the same way the powers of the department of the Director of the Air Service. Therefore, I think that the necessity of a member of the Army Council to be also a member of the Air Council does not arise.

Clauses 9 and 10 are common forms and are taken direct from the Military Pensions Act of last year. Clause 11 enables the fifth Secretary of State to sit in the House of Commons as well as his Under Secretary, and, at the same time, the provisions of the New Ministries Act are safeguarded.

Mr. P. A. Harris : Why is it necessary to create a new Secretary of State for Air and not for Munitions?

Major Baird : The head of the fighting Service will have to

Ave Atque Vale!—An Air-Bored Nightmare.



SECTIONAL ELEVATION OF THE HOTEL CECIL. (Drawn by one who has never been there.)—Foreground.—The Garage. (1) The Exchequer. (2) The Wait and See Hall. (3) The Official Communiqué Dept. (4) The X-Chasing Room. (5) The Experimental Demonstration Dept. (6) The Dire Designs Dept. (7) The Comic Chemicals Dept. (8) The Naval Chastening Dept. (9) The HOLY OF HOLIES, where IT SITS. (10) The Military Damnation Dept. (11) The Allies and Dependencies Dept. (12) The Political Consultations Dept. (13) The Strategy Dept. (14) The Operations Orders Dept. (15) The Airscrew Argument Room. (16) The Airship Contempt Dept. (17) The Parachute Experimental Room. (18) The Armament Demonstration Dept. (19) The Radio-Rot-Receiving Room. (20) The Watch Below (The Watch on Deck is seen above). (21) The Soot-Removing Dept. for the Roof Crew. (22) The Roof-Crew's Magazine and Smoking Room. (The A.A. Defences are seen above.). Lifts, Passages, and No-Man's-Land, are shown unnumbered.

discharge various duties now discharged by the Secretary for War, which cannot be performed under our constitution except by a Secretary of State. The channel of communication between an officer who feels himself aggrieved and the Sovereign is only through a Secretary of State. It would not be satisfactory if an officer of the Air Service felt himself aggrieved that he should have to apply to his Sovereign through the Secretary of State of another department. Another reason is to give to the Air Force the same status as we give to the Army and Navy, to recognise that the air is an element in which it is necessary to make provision for national defence and offence as it is for us to do on sea and land.

Clause 12 applies the Army Act, subject to certain modifications, to the Air Force. We were confronted, when we decided to have a separate Air Force, with having to choose between either the Navy Act or the Army Act, or creating some new Act for the purpose of enforcing discipline in the Force. After consideration, and on the advice of people well qualified to give it, we decided to adopt the Army Act with such modifications as would make it applicable and suitable to the Air Service. These modifications are set out in the schedule. They fall under the following heads:—Those which are required to translate military terms into Air Force terms, which constitute the bulk, and those which create certain new offences—for example, causing the destruction or capture of aircraft or loss thereof, tampering with air signals, and so on. There is obviously nothing analogous to that in the Army Act. The Act will automatically come into force with the passing of the Army Act.

Air Strategy and Tactics.

The Bill is not brought forward as a sign that the Royal Flying Corps or the Royal Naval Air Service is a failure. Anything but that. It is brought forward because it is felt that the moment has arrived when the existing organisation is incapable to discharge the duties which, in the national interest, it seems necessary should be discharged. In particular it is necessary to create an authority whose exclusive duty should be to study and deal with the general problem of war in the air. That authority will be created by the General Staff Branch of the Air Council.

At present the study of these aerial war problems is confined to two separate watertight compartments, each of which is limited to the assistance which can be given by the Air Force to another arm. That means that assistance can be given on the one hand to the Navy and on the other hand to the Army, but it is nobody's business under the present organisation to think out air problems as a whole. In the second place, it is necessary to provide a unified system for ensuring the most rapid scientific, technical, and tactical progress in aeronautics. In the third place, it is desired to provide a unified system of administration to replace the present duplication of staff and divergence of methods.

These, briefly, are the reasons which have weighed with the Government in bringing forward this Bill. But I would appeal to the House most strongly to look upon this as a war measure in the first instance—that is to say, that the urgency of passing it is great. It is a measure which undoubtedly ought to supply an organisation that will largely increase the effectiveness of our national resources, and consequently help towards a peace which can only come after victory. But, much more than that, it lays down the principle for all time that we recognise that we are no longer solely an island, and that, so far as the air is concerned, we have to take measures for the protection of the realm and the maintenance of our rights in the air just as far-reaching and as permanent as we have to on the land or on the sea.

I think anybody who has made a close study of this question will realise two things. In the first place, supremacy in the air is as essential to our national existence as supremacy at sea, and in the second place Providence has endowed Britons of all climes, be they born in Canada or Australia, or in these islands, or in South Africa, with a special aptitude for airmanship which gives us a field for great work in the future.

Unitarian or Trinitarian.

Mr. Joynson-Hicks (Brentford, U.) asked whether there would be a complete transfer of both the Army and the Navy Air Services to the new Air Board.

Major Baird said the Bill had been approved in principle by both Services, and such a transfer would take place.

Mr. Joynson-Hicks said he welcomed that statement. He also assumed that when the new Air Board was established there would be still two separate Air Forces—one for the Army and the other for the Navy—at the disposition of the Commanders-in-Chief of those Services, but both under the supreme control of the Air Board. He asked whether the defence of England was to be transferred to the proposed Secretary of State for the Air, or to remain, as at present, with the Army.

He had always advocated the creation of a new separate command apart from the Army and Navy, under the Air Board, with fleets of machines of its own for strategic offence. The people of this country were not at all satisfied with the mere bombing of positions behind the German lines; and he hoped the new Air Board would decide that it was desirable, from a psychological point of view, to smash the moral of the German people, which would have a great effect on the moral of the German soldiers in the field.

It all came back to a question of production, and he pressed for bigger machines and more highly-powered engines to deal with the quickened and intensified enemy production. He believed that if the Prime Minister had been able to devote his wonderful imagination and driving power to the production of aeroplanes the war might have been ended in the air before the present moment.

Lord H. Cecil (Oxford University, U.), said he was a strong supporter of the Bill. It was no doubt true that the utmost harmony reigned in the administration of the Air Service, and the utmost good will was shown by those who served in the Ministry; but in his belief it was one of those institutions in which those qualities managed to make work the worst kind of machinery that the mind of man could have designed. Of course, he had in mind not what took place over the Channel, but of the administration in London. The organisation which had the intelligence had not the authority, and the organisation which had the authority had not the intelligence.

They might as well have the administration in the hands of the High Court of Justice and the Bench of Bishops. The essential knowledge united with authority was lacking. It would be as impossible ultimately to have the Flying Service under the control of the War Office or the Admiralty as it would be to put the Navy under the control of the War Office, or the Army under the control of the Admiralty.

The Bill, however, was only a beginning, as was inevitable in time of war. It was not to be supposed that one could cut off as with a knife the Air Service from the Army and Navy, and it would require very delicate judgment to decide whether any particular thing was essentially an aerial or military or naval matter. The process would be difficult and intricate, and would need the utmost care. It was therefore desirable that there should be, first of all, an Air Minister able to investigate the whole subject and then gradually to draw out the threads which connected the Air Service with the Army and Navy, and which too often restricted its efficiency. The Bill, in fact, was a foundation upon which a structure could be erected.

He did not imagine that there would be any substantial change in the Royal Flying Corps in the field, for no one contemplated doing anything to interfere with the supreme control of Sir D. Haig in strategy, tactics, and matters of discipline. But, of course, improved administration must react upon the efficiency of the Corps. Everything would depend on how the new Ministry carried out the task assigned to it, but the building up of this new force would be difficult and anxious work, requiring the utmost consideration.

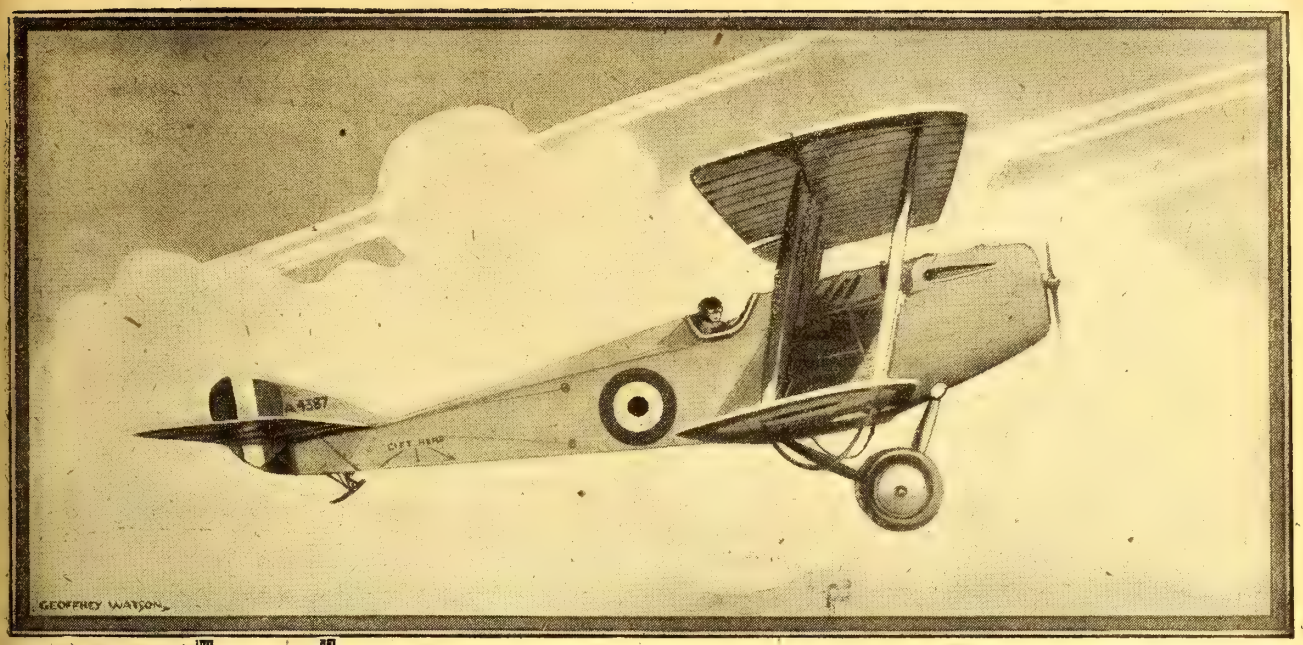
He was confident that by unifying and centralising administration, and giving real authority to an Air Minister, real vigour would be put into the machine. The prospect at this moment was an anxious one, and we owed it to those who were fighting our battles abroad to make the administration of our Services as efficient as it could be made, and therefore he hoped earnestly that the Government would press the Bill forward with all the rapidity possible.

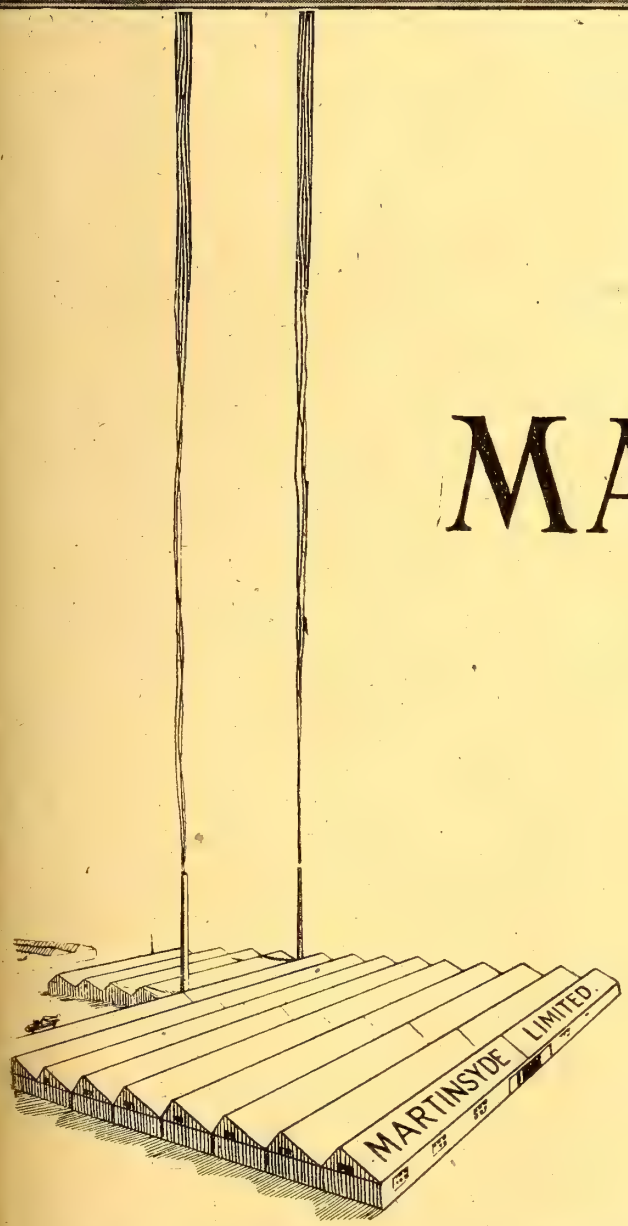
Sir H. Norman (Blackburn, L.) said: There was only one point he desired to raise. His hon. friend near him had said that he hoped there would not be left even a residuum of the Royal Flying Corps and the Royal Naval Air Service, and that they would be taken over completely. The Bill, however, would not do anything of the kind, if he read it rightly. It was permissive, and might leave both the R.F.C. and the R.N.A.S. precisely as they were. It might only have the effect of creating a third Air Service.

Major Baird said that there were officers who were doing admirable naval or military service, and whom it would obviously be unfair to take arbitrarily from the Navy and the Army, but if the Army Authorities or the Admiralty displayed an obstructive tendency—they had shown no sign of it—in regard to handing over to the Air Council officers who were trained only as airmen, the Council would submit the matter to the War Cabinet.

Sir H. Norman remarked that the Bill might create a third service, leaving the Royal Flying Corps and the Royal Naval Air Service as they were now except in matters which called for the intervention of the War Cabinet. Most officers who were interested in the subject looked forward to a time not far distant when, in the natural course of events, there would be one great Air Service. Uniformity of control of the air forces could be demonstrated to be absolutely essential if the war continued a given number of months.

Mr. Billing (Herts, E., Ind.), while expressing appreciation of the introduction of the Bill, criticised the measure as one which would not declare what must be done, but would leave too much to a bureaucracy. He had heard it suggested that Lord Northcliffe was to be the Air Minister, and certainly his lordship was a man of imagination and considerable force. He had heard the names of the late Director of Military Aeronautics







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and of General Smuts mentioned in the same connection. The House would place great powers in the hands of some person unknown to them if they passed the Bill in its present form.

A more nebulous Bill had not come under his notice in his short Parliamentary career. It contained nothing definite. What, for instance, was to be the power of the Air Minister when he came up against the wishes of the Army or Navy? In his opinion the Minister ought to have supreme control. If the Bill were merely a blind to keep the people quiet, as a sort of answer to the agitation for a new Air Board, it would be better for the House to refuse to pass it.

The Air Service wanted to know where it stood. It was essential that we should have an Air Service, and it was essential that it should be made worth a man's while to join and take up flying as a career in the same way as he would take up the Army or the Navy.

Major-General Sir I. Philipps (Southampton, L.) asked for more definite information as to whether it was the intention that the Royal Flying Corps and the Royal Naval Air Service should be handed over to the Air Council. He did not believe they were going to have a single air force as the result of this Bill.

Mr. Lynch welcomed the Bill, while holding that much would depend on the spirit in which the measure was carried out, and particularly on the choice of the Secretary of State.

Mr. Hohler (Chatham, U.) regarded the Bill as exceedingly nebulous, and asked to be told what the real intentions of its framers were.

The Attorney-General (Sir F. E. Smith), replying to some points raised, spoke of the growth of our Air Services as one of the most marvellous improvisations which this or any other war had ever brought about. The Bill contemplated the absorption by the new Air Council of the functions of the present Naval and Military Air Service authorities. The main and fundamental object of the measure was to recognise that most amazing factor in modern warfare, the invention of a new arm which had revolutionised the conditions of warfare.

The spirit of the Bill and the spirit in which the Orders in Council to be made under it would be conceived was that the Air Service should be recognised as a distinct Service, that those responsible for it should constitute a new and important Department answerable to Parliament, and having complete control, unfettered by either of the other Services, over all belonging to that Department. The only real qualifications would be that when airmen were lent to Sir Douglas Haig to act as the eyes of the Army the Air Council would not interfere and cause overlapping of control.

The Government recognised the friendly spirit with which the House as a whole had received the Bill. If they received the same indulgence during the later stages of the Bill they would be anxious to consider in a sympathetic spirit criticisms and suggestions for the improvement of the measure.

The Bill was read a second time, and committed to Committee of the whole House.

A Skeleton Measure.

It is evident that the Bill as it stands is purely a skeleton measure, which can be made into anything which the Government may fancy in the course of the third reading. It is not even clear whether the R.N.A.S. and R.F.C. are to remain as entities when the Bill becomes an Act.

It is quite conceivable that, for the sake of the tradition which the existing Flying Services have acquired in their short life, it may be advisable to retain those two Services as branches of the Air Service, or whatever the general title of the Air Force may be. There is no reason why they should not thus exist and retain their present uniforms, just as different regiments in the Army wear different uniforms, and just as the Royal Navy, the Royal Marines, the R.N.R., and the R.N.V.R. wear uniforms differing in greater or less degree.

It cannot be assumed incidentally that the Air Force will be so called officially, for the Navy and Army are referred to in official documents as His Majesty's Naval and Military Forces, and in future such references will take the form of "His Majesty's Naval, Military, and Air Forces," so there is no reason why the Air Force should not be called the Imperial Air Service, comprising the R.N.A.S., the R.F.C., and the Air Service, which might, as a compliment from the King, become the Royal Air Service when it has justified its existence.

There seems still to be a possibility that the Admiralty will refuse to part with any portion of its control over purely naval aviation, and the attitude which their Lordships may be pleased to adopt will lend interest to the Third Reading of the Bill.

As to the personnel of the Air Service, as distinct from the purely Naval and Military branches, it may be assumed that the majority of the R.N.A.S. will go over to the air branch at once. At any rate, most of the land machine personnel will do so. Few of them have any personal or traditional attachment to the Navy, and many would be glad to be free of Admiralty methods. On the other hand, most of them have every interest in the air. It is to be hoped, however, that the majority of those of the R.N.A.S. who are R.N. officers will remain in the Navy, especially the lately added senior officers.

Where the R.F.C. is concerned, however, things are very different. Most R.F.C. officers are proud of belonging to the finest Army the world has ever seen. Very many of them are professional soldiers who would sooner go back to their regiments than join a new Service, even if merely seconded thereto. There are, however, a certain number who have no personal interest in the Army as such, and there are a few professional soldiers who may fancy that they see in the new Service an easier road to the gratification of their personal ambitions than would be open to them if they remained in competition with minds of such fine quality as those which now handle the King's Armies in the Field. Such people will doubtless be eager for appointment to the new Service.

It is, therefore, greatly to be hoped that the keen and earnest soldiers now in control of the R.F.C. will somehow be enabled to retain their control over the new Service without being compelled even to be seconded from the Army in which they have spent the best years of their lives and in which they have learned to be such men as they have proved themselves to be.

A Word to Politicians.

The mere politician who bleats amiably about a Great Air Service, and the winning of the war in the air, and the mastery of the atmosphere, and so forth, fails to realise how much the Army means to the professional soldier, and thinks that the soldier can chop and change his Service as easily as the politician can change his political beliefs in obedience to his party interests. The idea that the Army may be of more importance to a soldier than his religion does not come within the ken of the politician's plastic mind. I commend the consideration of this point of view to politicians, both in uniform and out, whose one idea is a new Service with a new uniform, and, one fears, new manners and customs free from the high traditions of the King's Armed Forces as hitherto known to us.

When the Bill comes up for its Third Reading it is to be hoped that some provision may be made under which the R.F.C., at any rate, may for all intents and purposes remain an integral part of the Army, even if paid and equipped by the Air Council.

The Air Minister.

A noticeable omission from the Second Reading is any hint as to who is to be the first Air Minister. This is a matter which is apparently to be left entirely for the Government to decide *after* the Bill becomes law. The careful way in which the name of the Minister has been withheld makes one suspicious, knowing the ways of politicians, but it seems that those who have done such brilliant work in the last six months in the way of putting up output, weeding out wasters, and increasing efficiency are quite sure that they will be allowed to continue their good work, so one may still hope for the best. Anyhow, probably the Government has sufficient

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intelligence to realise that if a bad appointment is made, if the Air Council fails to make good, and if the Flying Services are let down, the result is likely to be an outburst of anger among the populace which may have results a good deal more serious than the mere downfall of this patchwork Coalition Government.

On the success or failure of the new Service the future of this Government depends in any case. If the Air Minister and the Air Council leave questions of production in the hands of the able men now concerned with such matters, and increase the power of those men so that they can break obstructionists and self-seekers among those who are nominally subordinates, the new Service will be a success, so far as material is concerned, and may lengthen the Government's term of office considerably.

The populace will judge the work of the Air Council largely by such circumstantial evidence as may be afforded by the success or otherwise of German air raids on London. Therefore, if the Air Minister is wise, he will leave this business in the hands of people who understand it, and will not start experimenting with new schemes of organisation run by new people who may rise to power in the new Service. It would be well to let the new Service justify its existence over the enemy's lines before committing matters of Home Defence to its unproved abilities.

As has been said, the Bill is purely a skeleton measure. The Government has in it a great opportunity. From the scheme for the organisation of the Flying Services, as it will probably be disclosed at the Third Reading, it will be possible to judge whether the business is in the hands of a statesman, or whether it is merely a piece of political eye-wash brought forward to appease agitators and humbug the British public. It is greatly to be regretted that nothing in the history of the present Government, or in the history of the majority of the members of the present Government, gives one any certainty that statesmanship is in any way concerned with the affair.

C. G. G.

A ROYAL VISIT.

The visit of the King and Queen to the works of the British and Colonial Aeroplane Co. Ltd., at Bristol, on Nov. 8th, recorded in the "Court Circular" of that date, aroused much local enthusiasm both outside and inside the works.

Their Majesties displayed much interest in what they saw, the Queen being very pleased at the appearance of the women workers and at the manifold nature of the operations which they were executing.

The principals of the firm were severally introduced to the King and Queen, who expressed their high appreciation at all they saw.

TESTIMONIALS.

At the Lord Mayor's banquet, on Nov. 9th, Sir Eric Geddes, First Lord of the Admiralty, in replying on behalf of the Royal Navy, made the following reference to the R.N.A.S. :—

"With all that I have said about the navies afloat I warmly associate the Navy that flies. (Cheers.) Comrades on the sea are the first to acknowledge the gallantry and efficiency of the Royal Naval Air Service in their co-operation with the Fleet over the sea, and also in the magnificent services they are rendering in assisting their comrades of the British Army all over the world."

Mr. Bonar Law said :—

"In respect of aeroplanes, in October, 1917, we turned out three times as many engines as in October, 1916. All these things show an amount of organisation such as has never happened before in the history of the world."

[An example of the hardware merchant's view of war.—Ed.]

LORD MONTAGU'S MOTION.

On Nov. 7th Lord Montagu of Beaulieu, who had on the order paper a motion calling attention to the recent air raids on London and other towns, and asking the Government whether they could, without conveying information to the enemy, make any statement as to the steps they proposed to take to defeat the enemy's aircraft and defend the capital, formally withdrew the motion, stating that he did so at the request of the Government, who thought that a debate on the subject at the present moment would not be opportune. Personally, he was sorry that the debate could not take place, as there was no doubt there was some public feeling on the question, and he was sure nothing would have occurred which would have given information to the enemy.

THE GERMAN ATTITUDE.

A small book, called "Deductions from the World War," has just been published by Lt.-General Baron von Freytag-Loringhoven, who was Q.M.G. in the field when General von Falkenhayn was Chief of the General Staff. He is now Deputy-Chief of the General Staff. After delays, due to the German censorship, General von Freytag's book has now reached England.

The chapter on "The Technical Development of the War" contains some interesting passages on aircraft and air raids. After remarking that aeroplanes have acquired a superiority over airships in land warfare, Freytag says :—

"The Zeppelins are extraordinarily sensitive. They have to keep at considerable heights, because they provide very large targets. This reduces the accuracy with which they can aim bombs. They also need a large expenditure of labour and materials, and they have to be housed in sheds. The brilliant invention of Count Zeppelin provided a weapon which, especi at the beginning of the war, was of great moral importance, and was also of indisputable value, because with the Zeppelin we got over to England; but in this sphere also the large fighting aeroplane has taken its place. . . . Aviation obviously has a great future. Its possibilities of development are numerous."

As regards air raids, Lt.-General von Freytag is very soldierly and to the point. He says :—

"Unfortified places of no military importance have had to suffer. The bombardment of these places is in itself objectionable, but the limits of what is permissible are in this matter in many ways elastic. A new weapon opens up its own paths, as is shown, for example, by the submarine war. In any case, in this struggle of the peoples with its economic background, the war is turned more and more against the enemy countries, and the principle hitherto accepted that war is made only against the armed power of the enemy is in this, as in other, spheres relegated to the background."

ANOTHER WARNING.

The "Auto" (Paris, Nov. 8th) publishes an interview with Signor Caproni laying stress on the advantage of using big aeroplanes for bombing. The inventor said that the enemy, helped by his large supplies of labour, had been working with tremendous energy, and produced his Gothas and Zeppelins with incredible rapidity. Signor Caproni added :—

> Next spring we shall see a remarkable blossoming forth of Austro-German effort. The rear will suffer equally with the front. Paris, Lyons, Le Creusot, St. Etienne, and St. Chamond will be bombed with a frequency that we do not dream of now. And in the same way the Allies will carry death and desolation into the enemy's country. But they ought not to lose a single minute.

Explaining the part that aviation would play in future battles, Signor Caproni said :—

> It is aviation that will bring the war to an end. Victory will go to that one of the belligerents who first perfects his aerial army. We must, therefore, speed up our production. The enemy is on our heels, and making tremendous efforts to gain the mastery of the air, without which victory in modern warfare is a myth.

THE POLITICAL VIEW.

Mr. Bonar Law, Chancellor of the Exchequer, concluding a review of Britain's achievements in the war at the Free Trade Hall, Manchester, on Nov. 7th, declared that we could look to the future not only with hope, but with absolute confidence.

Last September we dropped 1,700 bombs upon places in the West from which enemy aeroplanes come. We did more damage to the enemy in that month than he had done in all the raids he had made upon England since the beginning of the war.

We had a considerable number of machines bombing German towns, and though it was only a beginning more had already been done than the public realised.

[Once more it is well to point out to Mr. Bonar Law that towns in Alsace-Lorraine are only technically in Germany. Fool as the average Englishman is, he is not such a fool as to be humbugged into the idea that bombs on Alsace-Lorraine are reprisals for bombs on London.—Ed.]

THE UNITED STATES AIR SERVICE.

A Reuter message from New York states that the Aero Club of America has passed a resolution urging Congress to appropriate not less than a billion dollars for building an emergency air fleet of huge war planes as an offset to the mobility of the Germans on interior lines of communication. The sum, it is urged, should be in addition to the billion dollars needed to carry out the general aeronautical programme.

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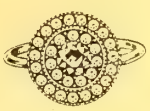
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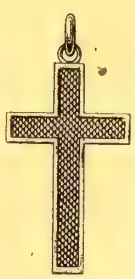
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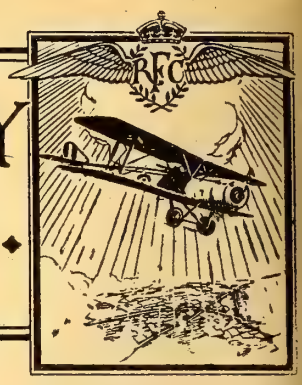
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FROM THE "LONDON GAZETTE."

Admiralty, Oct. 26th.

Oct. 30th.—R.N.A.S.—To be temp. Flt. Lt. :—N. H. Starbuck, June 30th.

R.N.A.S.—The notice which appeared in the "London Gazette" of Oct. 5th, relative to the promotion of temp. Flt. Sub-Lt. A. W. Carter, D.S.C., to the rank of temp. Flt. Lt., is hereby cancelled, this Officer having been previously promoted.

Temp. Flt. Sub-Lt. to be Flt. Lt. :—A MacDonald, Nov. 1st.

The notice which appeared in the "London Gazette" of Oct. 5th, relative to the promotion of temp. Flt. Sub-Lt. A. G. MacDonald to the rank of temp. Flt. Lt., with seny. of Oct. 1st, is cancelled.

Temp. Flt. Sub-Lts. to be temp. Flt. Lts. :—G. F. Browne, T. C. Lloyd, Oct. 1st.

R.N.A.S.—Temp. Flt. Sub-Lt. to be temp. Flt. Lt. :—H. E. Parker, Oct. 1st.

War Office, Nov. 3rd.

The name of the following Officer has been brought to the notice of the Secretary of State for War for valuable services rendered in connection with military operations in the field :—

Bt. Lt.-Col. (temp. Brig.-Gen.) W. G. H. Salmond, D.S.C.

[The mention is, presumably, for service in Egypt.—Ed.]

War Office, Nov. 6th.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing.—Flt. Comdrs.—From Flying Officers, and to be temp. Capts. whilst so empld. :—Lt. W. D. Thom, Spec. Res., Oct. 21st. Lt. W. J. Rutherford, Can. Local Forces, Oct. 22nd. Temp. Lt. E. R. Cottier, Gen. List; temp. Sec. Lt. M. B. Frew, M.C., Gen. List, Oct. 24th.

Adjt.—Capt. P. A. Landry, Can. Inf., from May 25th to Sept. 5th, and from Sept. 17th.

Spec. Appt.—Graded as a Park Comdr.—Capt. C. W. de Roemer, R.F.A., Spec. Res., from a Spec. Appt. (graded as an Equipment Officer, 1st Cl.), and to be temp. Maj. whilst so empld., Oct. 19th.

Experimental Officer, 1st Cl.—(Graded as an Equipment Officer, 1st Cl.).—Capt. B. T. Neville, Bedf. R., from an Asst. Instr. in Gunnery (graded as an Equipment Officer, 2nd Cl.), Oct. 19th.

Schools of Instruction.—Armament School.—Instr. in Gunnery.—(Graded as an Equipment Officer, 1st Cl.).—Lt. (temp. Capt.) J. W. Gordon, Spec. Res., a Flt. Comdr., Oct. 26th.

Asst. Instr. in Gunnery.—(Graded as an Equipment Officer, 2nd Cl.).—Lt. G. A. Heath, Glouc. R., Spec. Res., from an Asst. Instr. in Gunnery (graded as an Equipment Officer, 3rd Cl.), Oct. 26th.

Gen. List.—Sjt. T. Aldous, from R.F.C., to be temp. Sec. Lt., Oct. 20th.

Memorandum.—Temp. Sjt.-Maj. T. F. Beere, from R.F.C., to be Sec. Lt. whilst serving with R.F.C., Oct. 15th.

War Office, Nov. 7th.

REGULAR FORCES.—The following temp. appt. is made at the War Office :—

Asst. Dir.—Qrmr. and Hon. Capt. (temp. Lt.-Col.) A. Fletcher, M.C., R.F.C., from an Inspecting Officer of Depots (graded as a Depot Comdr.), and to retain his temp. rank whilst so empld., vice Capt. (temp. Col.) C. H. Whittington, R.F.C., Spec. Res., Aug. 31st.

Establishments.—R.F.C.—Mil. Wing.—Flt. Comdrs.—From Flying Officers, and to be temp. Capts. whilst so empld :—Sec. Lt. J. D. Payne, Oct. 20th. Sec. Lt. (temp. Lt.) C. R. Richardson, E. York R., Oct. 22nd.

Special Appts.—(Graded as Depot Comdrs.).—From Park Comdrs., and to be temp. Lt.-Cols. whilst so empld. :—Capt. (temp. Maj.) W. E. G. Statter, R. Lanc. R.; Capt. (temp. Maj.) F. A. G. Noel, Spec. Res., Oct. 19th. (Graded as an Equipment Officer, 2nd Cl.) :—Lt. (temp. Capt.) F. T. Bridger, R. Highrs., Spec. Res., from a Flying Officer, and to retain his temp. rank (without pay or allowances) whilst so empld., Aug. 24th.

War Office, Nov. 8th.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing.—(Equipment Officers, 1st Cl.).—Sec. Lt. (temp. Lt. J. E. L. Wrench, Spec. Res., from 2nd Cl., and to be temp. Capt. while so empld., Oct. 20th.

School of Instn.—Schools of Mil. Aeronautics.—Asst. Comdt.—Capt. G. G. Adeley, R. Ir. Rif., is graded as a Park Comdr. and not as in the "Gazette" of Oct. 12th.

School of Technical Training.—Co. Comdrs.—Graded as Equipment Officers, 2nd Cl.—Temp. Lt. P. P. C. Penberthy, Gen. List, from a Flying Officer; Lt. G. J. Dewhurst, K.R.R.C., Spec. Res.; Lt. N. O. M. Cameron, Cam'n Highrs., and to be secd.; Temp. Sec. Lt. J. W. Cairns, Gen. List, from a Flying Officer, and to be temp. Lt. while so empld., Sept. 24th.

Memorandum.—Miles Richard Witham to be temp. Hon. Lt. whilst empld. as Asst. Inspr. Aeronautical Inspn. Dept. Aug. 1st, 1917.

OVERSEA CONTINGENTS.—Canada.—Saskatchewan R.—Temp. Capt. E. C. Sheppard is secd. for duty with R.F.C. (May 26th).

War Office, Nov. 9th.

REGULAR FORCES.—Staff.—The following temp. appts. are made at the War Office :—Staff Capt.—Sec. Lt. (temp. Capt.) N. Martin, R.F.C., Spec. Res., from an Equipment Offr., 1st Cl., and to retain his temp. rank while so empld., vice Temp. Capt. R. W. Roylance, Gen. List, Oct. 20th.

Establishments.—R.F.C.—Mil. Wing.—Staff Officers, 3rd Cl.—Graded as Staff Capts.—Sec. Lt. R. G. Mitchell, R. Scots, T.F., to be secd., and to be temp. Capt. while so empld., vice Temp. Capt. F. W. Prendergast, Leins. R., August 25th. Temp. Capt. S. Henderson, Gen. List, from an Adjt., R.F.C., Oct. 17th.

Sqdn. Comdrs.—Sec. Lt. (temp. Capt.) S. G. Hodges, M.C., Wilts R., from a Flt. Comdr., and to be temp. Maj. while so empld., Oct. 29th.

Flt. Comdrs.—From Flying Offrs. :—Lt. S. J. Sibley, Spec. Res., and to be temp. Capt. while so empld., Oct. 24th. Capt. R. N. Montagu-Stuart-Wortley, Yeo., T.F., Oct. 25th. And to be temp. Capt. while so empld. :—Lt. J. Mitchell, Spec. Res.; Sec. Lt. C. R. J. Thompson, Spec. Res., Oct. 25th. Temp. Lt. H. M. K. Brown, Gen. List, Oct. 26th.

Special Appt.—Graded as a Flt. Comdr.—Lt. C. Patteson, M.C., S. Wales Bord., from a Flying Offr., and to be temp. Capt. while so empld., Oct. 18th.

Asst. Instrs. in Gunnery.—(Graded as Equipment Offrs., 3rd Cl.), Oct. 22nd :—Capt. P. S. Jackson Taylor, Heref. R., T.F., from a Flying Offr. (Obs.), temp. Lt. (temp. Capt.) W. L. Hill, Gen. List, from an Adjt., R.F.C., and to relinquish his temp. rank of Capt.

Adjt.—Temp. Lt. A. H. S. Baker, Gen. List, and to be temp. Capt. (without the pay or allowances of that rank) while so empld., Oct. 19th.

Spec. Appt.—(Graded as a Park Comdr.)—Temp. Capt. A. M. Thom, M.C., Gen. List, from an Equipment Offr., 1st Cl., and to be temp. Maj. while so empld., Oct. 19th.

Equipment Offrs., 1st Cl.—From the 2nd Cl., and to be temp. Capts. while so empld. :—Lt. H. I. Hughes, Spec. Res., Sept. 1st; Lt. B. Mott, Spec. Res., Oct. 16th.

War Office, Nov. 10th.

REGULAR FORCES. — Staff. — Special Appointments.—Graded for pay as Staff Capts. whilst comdg. Sqdns. of an Officer Cadet Unit, R.F.C.—Sept. 19th, 1917: Temp. Capt. E. G. G. Woodhouse, York and Lan. R., and to be transfd. to R.F.C. Gen. List; Capt. J. Welch, Northd. Fus., T.F., and to be secd.; Capt. J. S. Magrath, R. Suss R., Spec Res., and to be secd.

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Attd. to Headquarter Unit.—Brig. Comdr.—Bt. Lt.-Col. (temp. Brig.-Gen.) L. E. O. Charlton, C. M. G., D.S.O., Lan. Fus., from a Dir. at the War Office, and to retain his temp. rank whilst so empld., vice Bt. Lt.-Col. (temp. Maj.-Gen.) C. A. H. Longcroft, Welsh R., Oct. 18th, 1917.

Temp. Appointment at the War Office.—Director.—Maj. (temp. Brig-Gen.) G. Livingston, C.M.G., Lond. R., T.F., from a Brig.-Gen., R.F.C. Staff (graded as a Brig.-Comdr.), and to retain his temp. rank whilst so empld., vice Bt. Lt.-Col. (temp. Brig.-Gen.) L. E. O. Charlton, C.M.G., D.S.O., Lan. Fus., Oct. 18th, 1917.

Establishments.—R.F.C.—Mil. Wing.—Flt. Comdrs.—From Flying Officers: Capt. J. G. S. C. Smith-Grant, R. Scots, T.F., Oct. 23rd, 1917. And to be temp. Capts. whilst so empld.: Lt. L. J. MacLean, M.C., R.E., Oct. 24th, 1917: Sec. Lt. A. E. McKeever, Spec. Res., Oct. 26th, 1917.

Special Appointment (graded as a Flt. Comdr.).—Lt. G. L. Lumsden, Canadian Exped. Force, a Flying Officer, and to be temp. Capt. whilst so empld, August 10th, 1917.

Asst. Instrs. in Gunnery (graded as Equipment Officers, 3rd Cl.).—Oct. 22nd, 1917: Temp. Lt. G. M. Garro-Jones, Gen. List, from a Flying Officer (Observer).; Temp. Lt. R. C. Graham, M.G. Corps, and to be transfd. to R.F.C., Gen. List; Temp. Lt. C. J. Poole, Gen. List, from a Flying Officer (Observer); Sec. Lt. (temp. Lt.) A. V. Shewell, Glouc. R., from a Flying Officer (Observer), and to be secd.; Sec. Lt. (temp. Lt.) H. Davis, E. York. R., Spec. Res., from a Flying Officer (Observer); Sec. Lt. (temp. Lt.) J. A. P. Martin, Yeo., T.F., from a Flying Officer (Observer).

Adjt.—Lt. L. Henshall, S. Lan. R., T.F., to be secd., and to be temp. Capt. (without the pay or allowances of that rank) whilst so empld., Oct. 17th, 1917.

Depot Comdrs.—Capt. (temp. Maj.) A. V. Bettington, Spec. Res., from a Sqdn. Comdr., and to be temp. Lt.-Col. whilst so empld., Aug. 7th, 1917, but without pay or allowances prior to Nov. 1st, 1917. (Substituted for notification in "Gazette" of Oct. 18th, 1917.) Capt. (temp. Maj.) C. G. S. Gould, R.A., from a Sqdn. Comdr., and to be temp. Lt.-Col. whilst so empld., Nov. 1st, 1917.

Park Comdr.—Temp. Capt. G. L. Wightman, Gen. List, from an Equipment Officer, 1st Cl., and to be temp. Maj. whilst so empld., Oct. 15th, 1917.

Memoranda.—Bt. Lt.-Col. (temp. Brig.-Gen.) C. A. H. Longcroft, Welsh R., to be temp. Maj.-Gen., Oct. 18th, 1917. Temp. Serjt.-Maj. Noel Hemsley, from R.F.C., to be Sec. Lt., Sept. 17th, 1917.

War Office, Nov. 12th.

REGULAR FORCES.—Staff.—Attd. to Hdqr. Units.—Brig.-Comdr.—Bt.-Maj. (temp. Lt.-Col.) E. R. Ludlow-Hewitt, M.C., R. Ir. Rif., from a Wing Comdr., R.F.C., and to be temp. Brig.-Gen. whilst so empld., vice Bt. Maj. (temp. Col.) P. L. W. Herbert, Notts and Derby R., Oct. 17th.

Establishments.—R.F.C.—Mil. Wing.—Staff Officer, 2nd Cl.—(Graded for purposes of pay as a Brig.-Maj.)—Lt. (temp. Capt.) C. W. Wise, A.S.C., Spec. Res., from Adjt., and to retain his temp. rank whilst so emp'd., Sept. 6th.

Flt. Comdrs.—From Flying Officers, and to be temp. Capts. whilst so empld.:—Temp. Lt. W. G. Chambers, Linc. R., Oct. 1st. Temp. Lt. N. O. Vinter, Gen. List, Oct. 27th.

Group Comdr.—Bt. Maj. (temp. Brig.-Gen.) P. L. W. Herbert, Notts and Derby R., from a Brig.-Comdr., relinquishes his temp. rank, and to be temp. Col. whilst so empld., Oct. 17th.

Equipment Officers, 1st Cl.—From the 2nd Cl.:—Capt. W. R. Bruce-Clarke, Lond. R., T.F.; Lt. G. L. Godden, Spec. Res., and to be temp. Capt. whilst so empld., Oct. 22nd. 2nd Cl.—Qrmr. and Hon. Maj. A. Landen, D.S.O., North'd Fus., from the 3rd Cl., and to be temp. Lt. whilst so empld., Oct. 23rd.

Schools of Instruction.—Schools of Military Aeronautics.—Comdt.—(Graded as a Wing Comdr.).—Capt. (temp. Maj.) G. C. de Dombasle, Can. Local Forces, a Sqdn. Comdr., and to be temp. Lt.-Col. whilst so empld., vice Maj. (temp. Lt.-Col.) I. M. Bonham-Carter, North'd Fus., Sept. 10th.

Instr.—(Graded as an Equipment Officer, 1st Cl.).—Rank of Capt. G. I. N. Deane, R.E., T.F., is as now described, and not as in "Gazette" of Oct. 10th.

FROM THE COURT CIRCULAR.

Buckingham Palace, Nov. 7th.

The following officers had the honour of being received by the King this morning, when His Majesty invested them with the Insignia of Companions of the Order into which they have been admitted:—

The Distinguished Service Order and the Military Cross.

Capt. Reginald Lowcock, Sherwood Foresters and R.F.C.

The Distinguished Service Order.

Colonel Edward Maitland, Essex Regt. (Wing Capt. R.N.A.S.).
Flt.-Lt. Bernard Smart, R.N.A.S.

The King then conferred decorations as follows:—

The Military Cross.

Capt. Patrick Taylor, R.F.C.
Lt. Edward Lawson, R.F.A., attd. R.F.C.
Lt. Clement Watson, R.F.C.
Sec. Lt. Metford Lewis, R.F.C.

Royal Train, Henbury, Nov. 8th.

Their Majesties proceeded to the British and Colonial Aeroplane Factory.

On arrival the King and Queen were received by Mr. Samuel White (chairman) and the managing director and members of the staff had the honour of being presented. Major Ivan Dawson, representing the Controller of Aeronautical Supplies, and Lt. B. C. Bartley, Assistant Director Aeroplane Supplies, were also present.

Buckingham Palace, Nov. 11th.

Commodore Godfrey Paine, R.N. (a Lord Commissioner of the Admiralty and Director of Air Services), had the honour of being received by the King.

NAVAL.

The following appointments have been made in the Royal Naval Air Service:—

Nov. 7th.—A temp. commission as Lieut. (R.N.V.R.) has been granted to E. H. T. Atkinson, B.A., seny. Nov. 12th.

Nov. 8th.—Flt. Lt. (Temp.).—G. D. Kirkpatrick, to President, for Admiralty Compass Dept., Nov. 5th.

Nov. 10th.—A.M. (1).—A. F. Wickenden, granted temp. commission as Lt. (R.N.V.R.), seny., Nov. 7th.

Mech. (R.M.A.).—W. J. Mair, granted temp. commission as Lt. (R.N.V.R.), seny., Nov. 26th.

Messrs. E. Clough and H. M. Edwards, granted temp. commissions as Lt. (R.N.V.R.), seny. respectively Nov. 1st and 7th.

Nov. 12th.—Sub-Lt. (Temp.).—J. Kelly, promoted to Lt. (temp.) seny. Nov. 9th.

Pte.—J. Richmond, entered as Lt. (temp.) R.N.V.R., seny. Oct. 26th.

Admiralty Communiqués.

Nov. 7th.—On the night of November 6th bombing raids were carried out by the Royal Naval Air Service on the following military objectives:—Thourout railway station; Lichtervelde railway station; on a moving train near Lichtervelde.

Several direct hits on track and junctions are reported, but visibility was poor.

Large quantities of explosives were dropped.

All our machines returned safely.

Nov. 11th.—On the night of November 9th a bombing raid was carried out by the Royal Naval Air Service on the following military objectives:—St. Denis Westrem, Bruges Docks.

Large quantities of explosives were dropped with good results, a large fire being caused at the latter place.

All our machines returned safely.

The Casualty List.

Reported Nov. 7th.

Accidentally Killed.—St. James, Flt. Sub-Lt. J., R.N.
Isaac, Flt. Sub-Lt. W. A., R.N.
Weston, Proby. Flt. Officer T. R., R.N.

Missing.—Sieveking, Flt. Lt. L. G., D.S.C., R.N.
Andrews, Flt. Sub-Lt. G., R.N.
Shepherd, Flt. Sub-Lt. P. G., R.N.

Accidentally Injured.—Fryer, Proby. Flt. Officer H. I., R.N.
Smith, Proby. Flt. Officer J. A., R.N.
Hervey, Proby. Flt. Officer V. H., R.N.
Callow, Proby. Flt. Officer F. G. B., R.N.
Jenkins, Proby. Flt. Officer E. A., R.N.
Garraway, Proby. Flt. Officer F. F., R.N.

Previously reported Missing, now reported Prisoner and Wounded.—Ingleson, Flt. Sub-Lt. W., R.N.

Previously reported Missing, now reported Prisoner.—Phillips, Flt. Sub-Lt. A. W., R.N.

Reported Nov. 8th.

Killed.—Housden, A. A., Ldg. Mech., F.749.
Robins, H. R., Air Mech., 1st Gde., F.6479.

Died of Wounds.—Day, V. E., Act. Mech., 1st Gde., F.29349.

Reported Nov. 12th.

Died of Injuries.—Towers, Flt. Sub-Lt. G., R.N.
Herriott, Flt. Sub-Lt. G. H., R.N.

Previously reported Missing, now reported Killed.—Buckley. Flt. Sub-Lt. E. J. K., R.N.

Previously reported Missing, now presumed Killed.—Turney, Flt. Sub-Lt. K., R.N.
Cripps, Flt. Sub-Lt. J. W. D., R.N.

Correction.—Prisoner and unwounded should read Prisoner and wounded.—Akester, Flt. Sub-Lt. J. C., R.N.

(*Continued on page* 1448.)

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The 450-h.p. Friedrichshafen Biplane.

The French technical journal, "L'Aérophile," contains in its October issue an interesting description by M. Jean Lagorgette of a three-seater Friedrichshafen biplane, recently captured by the French near Verdun. Other specimens have been captured on the Macedonian front.

M. Lagorgette points out that the Flugzeugbau Friedrichshafen Gesellschaft, m.b.H.—a branch of the Zeppelin Company—has for a long time specialised in the construction of single and twin-engined seaplanes, the location of their works on Lake Constance making this very natural.

For some time they have also made land machines, notably twin-engined types, a recent example of which is described hereafter. The machine is, in fact, only a transformation of their big seaplane.

One of the principal changes is the use of arrow-shaped wings, a return to an early German principle.

The machine is of what is sometimes called the "general purpose type."

It is quite possible that it has not been absent from recent raids on England and on the suburbs of Paris, in company with the Gotha, to which it offers many points of resemblance, though on a reduced scale, having its airscrews behind in accord with the tendency of modern German twin-engine machines.

The dimensions are considerably less than those of the Gotha :—

Length, 11 metres (36 ft.). Height, 3.6. m. (11.7 ft.). Span, top plane, 20.3 m. (66 ft.); lower plane, 18.85 m. (61.2 ft.). Chord of planes, 1.8 m. to 2.3 m. (5.9 ft. to 7.5 ft.).

The gap is 1.95 m. (6.2 ft.). The total surface of the wings is 70 sq. metres (695 sq. ft.).

The wings are set at a dihedral and are slightly swept back, with the exception of the fixed centre section; the top and bottom members of which are slightly unequal, because of the arrangement of the "V" supports of the motors. There is a very slight stagger to the planes, which are oblique at their extremities.

The ailerons are set into the planes, and project outwards at the tips. They have also a slight "balanced" projection into the plane.

A considerable portion of the trailing edge in the centre of both planes is cut away to allow clearance for the airscrews.

On either side of each motor are two struts with a decided outward and upward thwartwise slope, the arrangement of which is responsible for the more accentuated dihedral on the top plane.

Two oblique cables on either side unite the extremity of each upper plane to the bases of the exterior interplane struts.

The distance between the two main spars, and consequently between the front and back interplane struts, is 1 metre (3.25 ft.).

The front spar is close to the leading edge, consequently there is a considerable proportion of wing surface behind the rear spar, as in most German aeroplanes.

The spars in the centre section are constructed of steel tube. Those in the outer sections are made of wood. The cabane consists of four vertical struts.

Contrary to Gotha practice, the ribs are parallel with the axis of the machine.

Each aileron has at its extremity a balanced part in front of its hinge. The span of each aileron is 3.8 m. (13.3 ft.), the surface being about 2.3 sq. m. (22 sq. ft.).

The wings are painted red-brown on their upper surface, and clear blue on the lower side.

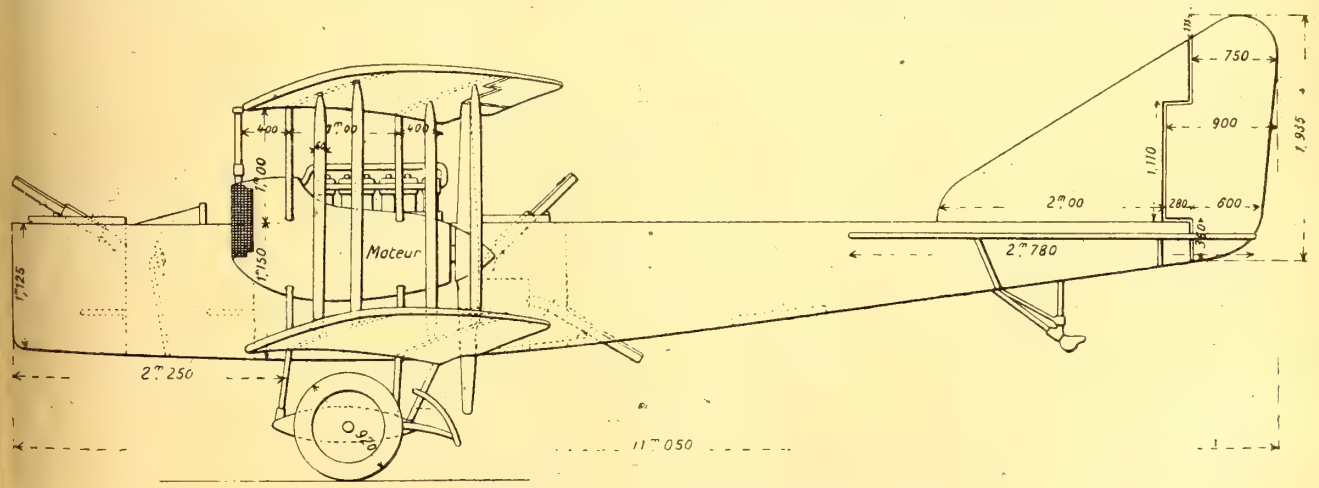
The horizontal tail members are 3.95 m. span, and 3.65 m. in length, and have an irregular polygonal shape like that of certain 1914 Albatros machines. The same may be said of the vertical surfaces, which consist of a fixed fin of triangular shape, but slightly rounded in front, after the manner of certain British biplanes, and becoming popular in recent German types.

As in nearly all German machines, the tail controls are balanced, and are constructed of tube work. The balance portion of the rudder is 1 m. × 0.25 m.

The fuselage is of the ordinary rectangular type, the upper surface being horizontal when in flight. The maximum height is 1.27 m., the width being 1.2 m.

In the front of the fuselage is a gun-ring, with a seat for the gunner, there being sufficient room for him to change places with the pilot, who sits immediately behind him. Behind him again is the petrol tank, which is 0.9 m. wide, and on either side of it is a narrow bomb chamber.

At the back is another machine-gunner, who sits inside a



The 450-h.p. Twin-engined Friedrichshafen Biplane.

rotating gun-ring, and further aft still is a trapdoor in the bottom of the fuselage. Through this trap the rear gunner is able to fire downwards and backwards.

As in the Gotha, an archway, cut through the lateral partitions of the fuselage, permits the rear gunner to go forwards, or the front gunner to go aft.

The fuselage is constructed in two portions for ease of transport, the joint being in line with the trailing edge of the planes, so that the rear gun-ring comes away with the tail end of the fuselage, leaving a compact central section.

There is no fairing on the top of the fuselage, which is of rectangular section along its whole length. The construction is ordinary, consisting of four timber longerons, with wooden distance struts, and cross braced.

The front of the fuselage is covered with three-ply to the rear of the motors. The remainder is covered with fabric.

The landing-carriage is not characteristic of German aeroplanes generally. Underneath each motor is a pair of 765 mm. wheels, mounted on a common axle, giving a track of 0.8 metres, sprung by elastic cord from a large streamlined horizontal skid.

The back and front ends of this skid are attached to a pair of vertical chassis-struts, inclined somewhat towards the rear, whose upper ends are anchored to the bases of the steel "Vs" which support the engine. The ends of the skid are also attached to a strong diagonal strut which runs to the base of the fuselage.

There is no claw brake.

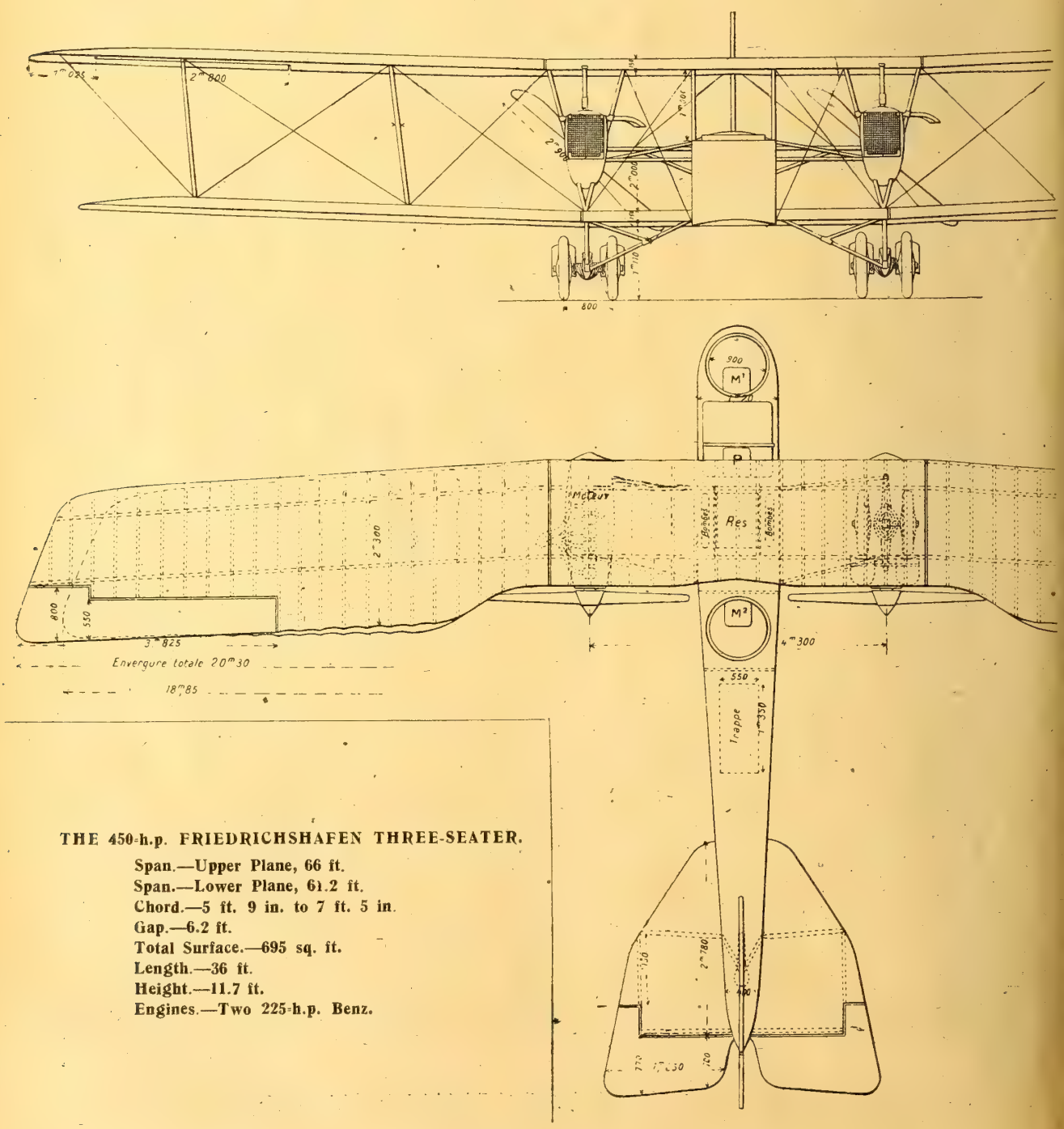
The tail-skid is constructed of ash, with a metal shoe, and is attached to the lower end of a vertical tube, built into the fuselage, where it bears against a compression spring. The upper end of the skid is anchored to a tension spring, and the whole thing is reinforced by oblique tubes running from the bottom longerons of the fuselage.

The motors are mounted between two pairs of "V" struts at a distance of 2.1 metres from the centre of the machine, and are linked to the fuselage by three nearly horizontal tubes. The Benz engines have six cylinders each. One, numbered 22799, gave 226 h.p. at 1,410 r.p.m. No. 25344 gave 221 h.p. at 1,400 r.p.m.

Each of the engines is enclosed in an ovoid bonnet, at the rear end of which is a small pointed cap attached to the airscrew, so completing the streamline. In front of the engine is a honeycomb radiator, fitted in front with a blanketting arrangement.

The airscrews, trade-mark "Imperial," are 2.9 m. in diameter.

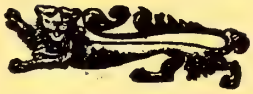
The petrol tank and the two independent gravity tanks in the upper plane have a capacity of about 550 litres.



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Span.—Upper Plane, 66 ft.
Span.—Lower Plane, 61.2 ft.
Chord.—5 ft. 9 in. to 7 ft. 5 in.
Gap.—6.2 ft.
Total Surface.—695 sq. ft.
Length.—36 ft.
Height.—11.7 ft.
Engines.—Two 225-h.p. Benz.





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The oil tanks are placed above and behind the radiators (and so keep their contents warm).

The gun-rings are of special type, and are constructed of oval tube, running on rails. There is a locking device. The lower gun is mounted on a simple pivot and fires through a trap; there being no attempt at a tunnel down the fuselage as in the Gotha.

The bomb chambers are similar to those of the Gotha and other German machines, consisting each of six superimposed vertical cases. They can be released by either passenger.

Other bombs are carried longitudinally underneath the fuselage, supported by spring clips. In all, the machine can carry twelve explosive bombs and several incendiary bombs.

	kgs.	lbs.
Weight of machine, empty	2,200	= 4,840
Useful load	520	= 1,180
Fuel load	432	= 940
Total	3,152	= 6,960

This represents 45 kgs. per sq. metre, or 10 lbs. per sq. ft., and 7 kgs. (15.4 lbs.) per horse-power.

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(Twenty-first Instalment.)

BY STEPNEY BLAKENEY.

In checking the tail plane we can do this two ways; we can measure with a steel tape from a marked and fixed point near the tip of the tail plane on the leading edge, each side of the machine, to a fixed point on the leading edge of each of the lower main planes. (Take care to use the brass ring of the tape, and include it as part of the measure, a point many men fail to note, and are consequently astounded at the imaginary error they find in the measurement, due to their own lack of knowledge in measuring with steel tapes.)

This distance should be equal on either side of the machine. If it is not, then some adjustment must be made with the fittings of the tail plane, to enable the measurements to be corrected and equal.

These measurements will have to be taken again as soon as the necessary adjustments are made and the distances equalled and corrected.

Odd Jobs.

Having checked the position of the leading edges of all the planes on the machine, relative to their being at right-angles to the centre line of the fuselage of the machine, we can now proceed to attach the cable controls.

Other men can be detailed to lock up all the bracing wires, with the lock-nuts, and put in all split-pins, and spread the ends of same. If circular steel wire and strainers are used, then the barrels must be locked with soft iron wire, fastened round the upper portion of the fork-end and passed through the barrel of the strainer, and the end again made fast to the wiring plate or eye-end of the strainer, to prevent the barrel from turning round owing to the vibration of the wires.

Truing the Rudder.

Whilst all this is being done, we must ascertain that the rudder is in a truly vertical position. It is hardly necessary to point out that before checking the rudder to ascertain if it is in a vertical position it will be necessary to satisfy oneself that the fuselage has not been moved or shifted from its horizontal position, both longitudinally and transversely, otherwise the check will be of no use.

To check the rudder we may use a plumb-line and plumb-bob, which can be held close up to the trailing end of the rudder, and then the inspector, or erector, can sight across this line to the edge of the rudder. If the rudder is out of truth then the edge of the rudder will not coincide with the plumb-line. This is not probable unless some bad work in the fittings has passed unnoticed.

Attaching Control Cables.

The attaching of the control cables should be only done by experienced erectors, namely, men who are thorough and conscientious in their work, and know what are the functions and uses of the ailerons, elevators and rudder.

Before putting in any of the cables, etc., they must be very carefully examined for faults of any kind, even though they may have been previously supposed to have been examined and passed. The responsibility must rest with the erector who puts them in.

Aileron Controls.

The first cables to put in will be the aileron controls. These will be attached to the control wheel, or control pillar, which works them.

In putting in the cables excessive tautness is not desirable, as it only puts unnecessary strain on all the pins, fork and eye-ends, cable joints, cables, and the pulleys and fittings holding them, and lastly, on the bolts holding these fittings to the spars and levers. This in due course will cause excessive resistance to movements, and will possibly cause some portion to fracture or bend.

Controls must be absolutely sensitive, and the slightest movement of the control wheel or lever should correspondingly be transmitted to the ailerons. To produce this simultaneous movement there must be perfect and equal tension in the left and right-hand control cables without excessive tautness, otherwise the machine is going to be hard to control, and very fatiguing to the pilot. These faults are most undesirable, and if allowed to exist may have bad and far-reaching results.

All controls should respond to any applied force with smoothness and ease of movement right up to the extreme limits of movement possible, and any tightness or stiffness at any part of the movement should be most carefully traced from the lever, along the cables to the ailerons, elevators, or rudder, according to whichever unit is being tested, and the fault should be removed without fail.

Angle of Movement.

The angle of movement, both up and down, of the ailerons and elevators must be equal, and also be equal on both sides of the machine, one with the other. This angle of movement required will be obtained from the drawings, and must be carefully measured. The inspector must satisfy himself that the maximum angle of movement called for is obtained. This remark applies equally to the ailerons, elevators, and rudder.

In fixing up the control cables it is just as well, for the first trial, to test the control of either the ailerons, the elevators, or rudder, independently, so that in the event of any stiffness of movement existing it may be quickly located and remedied.

Having fitted up the control cables independently to the ailerons, the elevators, and the rudder, they should be all coupled up together and the whole control tested, and if found to give the maximum angles of movement required with smoothness of working, the controls may be considered complete.

General Examination.

The next thing to do now is systematically to examine the whole machine and make sure that all wiring plates are in the same line as the cables attached to them, otherwise, when the flying strain comes on them, they will flatten out, or a fork-end may snap, possibly with disastrous consequences.

Also, it is necessary to see that the angle of the bend of wiring lugs commences close up at the head of the attachment bolt, and also that one of the flat faces of the bolt-head is square to the bent lug. These details, though of no particular interest possibly to the lay mind, or inexperienced erector, are quickly noticed by the inspectors or pilots. Such errors are certain to cause considerable dissatisfaction, and will have to be eliminated. For this reason only men who have had experience in erecting machines ready for flight should be put on this inspection work, as their training and past experience in these matters enables them to know exactly where to look for faults, and when found, to know if they can pass the work or not. And if they will not pass, as they should not, they know what is the most suitable way of dealing with such faults.

The next thing to examine will be the cable-ends and strainers, or fork-ends, and see that all split-pins are properly put in. There are a considerable number of people, both men and women, whose duty at times is to put split-pins into position, who have not the remotest idea of how they should be put in, and the ghastly samples of this simple operation which are frequently met with certainly call for comment of a forcible or even lurid character.

Split-Pins.

A split-pin consists of a length of half-round soft iron wire bent double, with a loop in the middle of the length, and the ends when closed together meeting evenly and forming a round wire, to all intents and purposes.

The split-pin thus described is generally used to pass through two slots of a castellated nut and the centre of the bolt, not less than 1/16 in. from the end of the bolt, the loop of the split-pin remaining outside the slot of the nut, and not forced, hammered, or punched into the slot of the nut and mutilated. The length of split-pin passing through the opposite slot should be equal in length to the diameter of the bolt. This length is split open and the ends opened and bent back against the side of the nut.

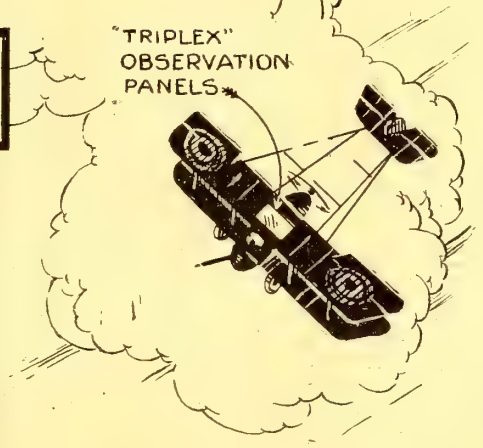
The loop at the end of the split-pin, which should project beyond the nut, should not be damaged, as this loop is needed to catch hold of should the split-pin have to be removed at any time.

(To be continued.)



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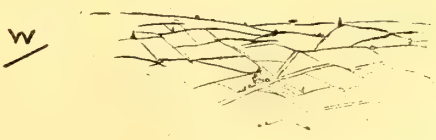
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In and Out the Carburettor.

By O. P. M.

Designers of carburettors seem apt to overlook the fact that the principle of correct carburettion—a word which is generally used in the sense of correct explosive mixture under many varying conditions—is as much a question of dynamics as of statics. The brains of inventors are all turned onto the problem of the carburettor itself, the best design and arrangement—jets, choke-tubes, air-intakes, and the rest—each one highly important in itself, and deserving of the closest study, but tending to vary one with the other in a manner which is as yet in the region of the unknown.

For instance, it is well known that the friction of liquid in a pipe depends very largely on the velocity of flow and on the wetted perimeter. But it would be interesting to experiment into the problem of the flow of petrol through relatively minute passages of varying diameter, and length—under varying temperature conditions and pressure. It is almost certain that the latest practice of jacketing the carburettor would have some effect in the direction of increased flow.

In the writer's opinion no design of carburettor can hope to take care of all the multitudinous points required of the modern engine. Easy starting under all weather conditions, quick acceleration, low petrol consumption at all speeds (and under varying conditions of fuel density), and evenness of running are the principal of these, regarded from the design point of view. But simplicity, get-at-ability, and non-liability to get out of order or to leak, are equally important from the user's. And it is the user who generally has the final say.

DIRECT INJECTION.

Have designers yet considered that the suck of any particular cylinder of an engine—running at any given speed— depends on the fit of the piston rings, the viscosity of the lubricating oil employed in the crank-case, not to mention its temperature and other similar causes, operating inside the cylinder itself, and not connected with the carburettor at all? Most engines are weak in compression on one (or more) of their cylinders, compared with others; and as a consequence, it would seem that one solution of the carburettor problem would be found in a pump, which delivered predetermined quantities of petrol into each cylinder, depending on the will of the pilot—following something on the lines of the Diesel practice.

But the modern pilot or driver has other things to attend to besides his carburettor controls—he expects his engine to function automatically, and to behave as nearly as possible like a good-tempered and successful racehorse; and provided he himself possesses "hands," no great disappointment usually awaits him.

Thus, apart altogether from technical considerations, practical usage would seem to preclude any such solution, although a similar system does away very largely with the important unknown quantity—the variation of the engine suction from time to time and even minute to minute at any given speed.

INSIDE THE PIPES.

The velocity of flow of the vapour mixture as it passes up the induction pipe is an indeterminate quantity. As the inlet valves open and close, the vapour mixture assumes a state of surge, particularly if the pipe diameter is on the small side. If we allow that fitters do their best to make the fit of piston rings the same in each cylinder—then each cylinder should have an equal opportunity of obtaining its necessary vapour supply under similar conditions.

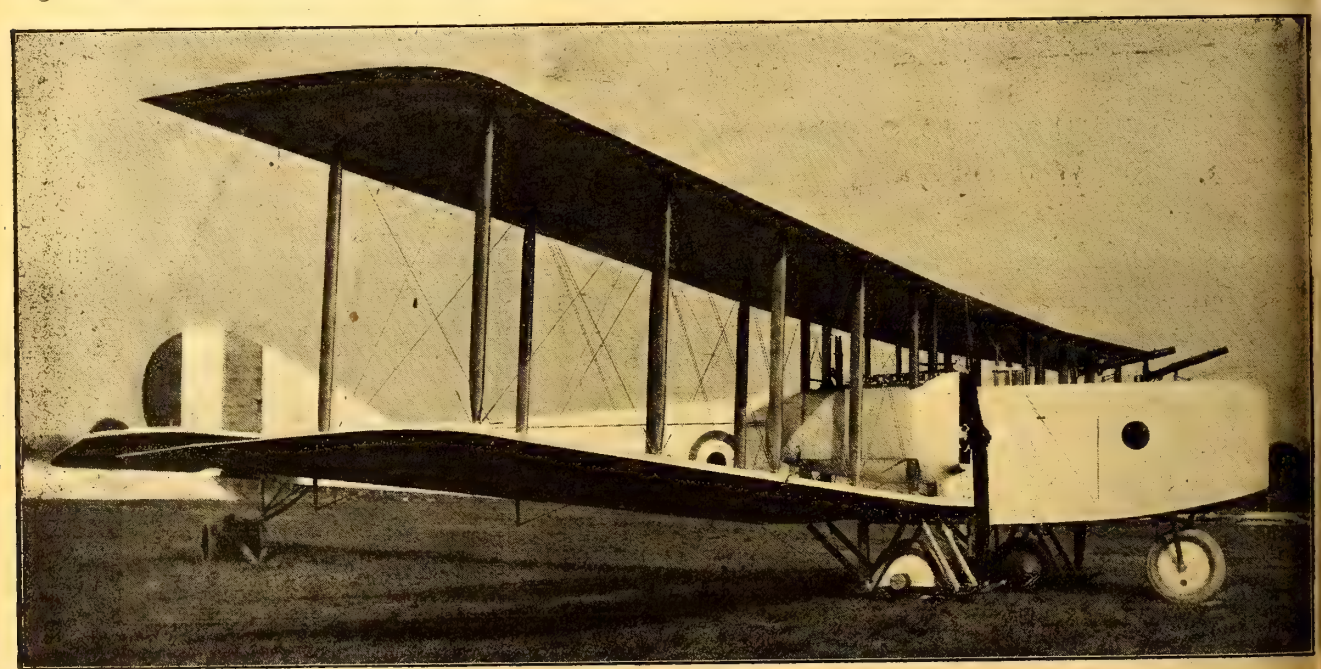
But even in modern practice this is seldom the case—particularly in lorries. For little attention is paid to making curves as easy as possible and always in the same direction. Elementary dynamical theory teaches clearly that pipes should be as large as possible, of smooth interior and of easy curvature, where curves are absolutely necessary. But the question as to how far it is possible or desirable to utilise the induction pipe as a small vapour reservoir, and to construct the cylinder inlet pipes as short as possible and of symmetrical shape, hardly appears to have received sufficient attention.

Such a capacity increase would seem to give the possibility of greater steadiness of running, provided it were not pressed to extremes, although a slight tendency to condensation might occur when cold. Already it is common practice to jacket the induction pipe and even parts of the carburettor; so nothing but good would result from jacketing the petrol pipe itself before it enters the carburettor.

VELOCITY OF FLOW.

A slower initial velocity of flow of vapour as the inlet valve opens would be the result of large well-designed induction pipes; but the volume passing per second would be greater. Nor must it be forgotten that each time a valve opens, the vapour mixture, approximately at rest, has suddenly to accelerate up to a certain point—the suction force exerted depending on the fit of the piston in that particular cylinder.

What is required is that a certain volume of vapour, the nature of which has been predetermined by the carburettor setting, should pass into a given volume of space in a very small interval of time. This necessary volume is much more likely to be a continuing fixed quantity if drawn from a reservoir of suitable—a hateful but necessary word—capacity and at slow initial speed than if the reverse order of proceedings were attempted. High velocities at small, finite intervals, are notoriously difficult to estimate and check, and above all to measure. This is constantly found in all forms of experimental engineering.



AN INTERESTING PIECE OF ANCIENT HISTORY.—A twin-engined three-seater, very similar to the Friedrichshafen Biplane illustrated on page 1415. This machine was designed before the war by Mr. G. M. Dyott for Survey Work in Africa. It was officially turned down in 1914, and again in 1915, but was built in the end of 1915 and the beginning of 1916 at the expense of two wealthy men. It was flown in March, 1916, after being built in three months. It carried a quick-firer gun, pilot, two passengers, and fuel for five hours, and had a very good performance. It was not considered advisable to perpetuate the type, the task of perfecting it being left to others, including the German designers.



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PIPE-SHAPES.

In many engines, particularly of the light car type, rectangular induction inlet openings are cast, and the induction pipe—circular or oviod in section—is carried down to the carburettor in four branches of varying length and curvature. Why make a port rectangular in shape?

The vapour travelling up the pipe in a fairly steady streamline meets, suddenly with a change of shape and many sharp corners—a change which completely alters the vapour streamline and causes "wire-drawing." Much greater care should be exercised by designers at this point, so as to keep this vapour streamline symmetrical right up to the valve seat, and so attempt to give to each cylinder constancy of supply.

The whole tendency of design of the carburettor itself—and, indeed, of all mechanical contrivances—is towards simplicity; not because a complicated design is itself essentially wrong, but because the bulk of users have not the time (nor the inclination in many cases) to acquire familiarity with complex structures, when simple ones work almost as well. A cold, dark night, with sleet and rain and a gale of wind blowing, is apt to cause confusion of thought to the designer himself, when called upon to unblock his own carburettor.

In passing, theory would seem to show that the induction pipe proper should be shaped to suit particular velocities; but in practice the difference in volume passed would be negligible, provided sufficient margin on the high side were given of the volume required. Attention to the shape of the exhaust ports and openings would be equally useful; and, moreover, the valve heads should never be flat at any part of the underside.

WATER EFFECTS.

An interesting point might here be mentioned: it is common experience that a motor runs better—or seems to—in the evening than at any other period of the 24 hours. It is certainly the writer's experience. This can only be due to the difference of the hygrometric conditions of the atmosphere at that time.

Now a good deal of attention has been given in the past to water injection in the cylinders for cooling purposes in internal-combustion engines, and with satisfactory results. The system causes a lesser temperature of explosion, through the injected water giving up its latent heat and turning into steam, whose temperature and pressure correspond to the explosion pressure. A slightly smoother action in running is also noticeable; due perhaps to the well-known cushioning effect of steam.

Attention has been drawn to the possibility of mechanical spray carburettors, which are inserted to atomise the petrol before reaching the induction pipe; but the writer would be interested to see the results of any carburettors which had attempted to make use of a minute quantity of water used proportionately with the petrol, and carried up the induction pipe. Spreading a constantly damp cloth over the air intake, would give this effect on a small scale.

Under certain conditions of water injection, slight chemical action upon the walls of cast-iron cylinders takes place; but the life of an aviation engine is short and cylinders are scrapped on the slightest pretext in any case. Experiment on the special steel cylinders of which many aviation engines are composed, might give some useful information.

The best pilots are seldom good mechanics—they make the mistake of supposing that a complicated piece of mechanism possesses no soul—not even an iron one. An improvement tending to a sweeter running engine would lessen the repair bill, and additionally, some experiments have shown that greater power is developed when water injection is used than when no water is admitted. The weight of water to be carried, would be a negligible factor, compared, say, to the varying weight of the pilot himself.

But perhaps of all troubles, the difficulty of starting is the hardest to cure. Metals are available which are very largely acid-proof, if the acid is not too strong. Perhaps even yet some form of chemical heating for starting purposes may be developed—to the saving of the country's petrol bill, when large lorries are left to run all night because of difficulty of manual starting.

EMPLOYER'S LIABILITY.

At the London County Council recently, twelve women had entered a claim against their employer for an award under the Workmen's Compensation Act for injuries received as a result of the air raid on June 13th. Their case was that when they resumed their work as capmakers after the raid their hands came into contact with some powder from a bomb which had exploded near by. This powder had got on to the cloth, and they contracted dermatitis, which incapacitated them for some time. It was intimated that an admission of liability had been received and a settlement arrived at.



A PIECE OF ANCIENT HISTORY.—Three-quarter front view of the Dyott three-seater, of 1915, which the recent Friedrichshafen design so strongly resembles. The fact that this machine was a tractor, and not a pusher, is immaterial. The front wheel was made easily removable, being intended only for use at night, to prevent the machine from standing on its head.

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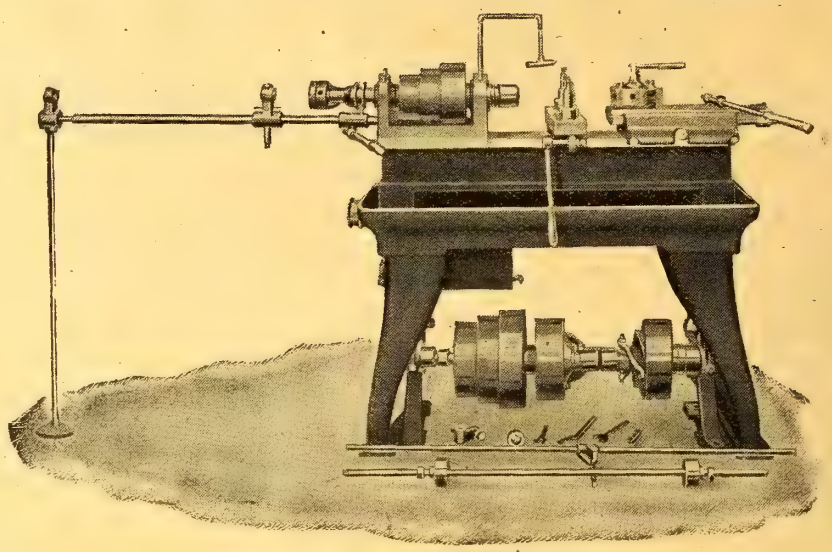
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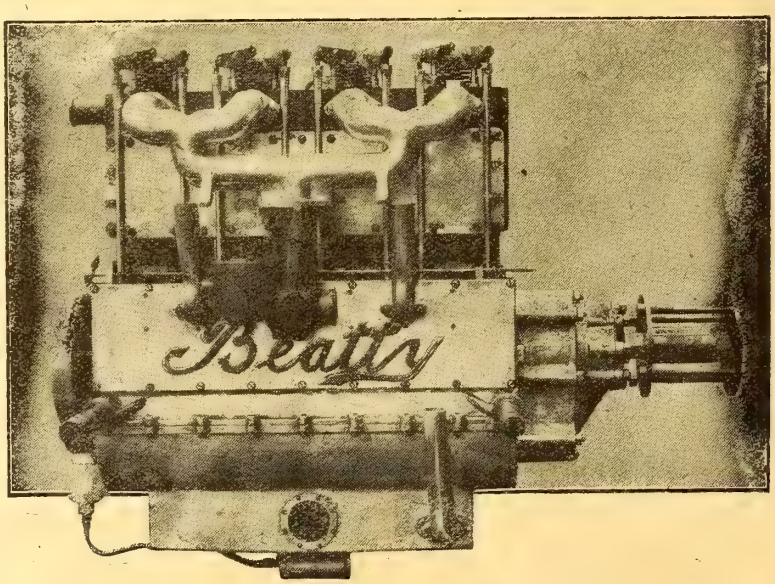
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British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol." Bristol 3096.
British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudropian, Crickle, London." Hampstead 5551.
Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6. Hampstead 4403 and 4404.
Davidson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1144-1145
Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1176.
Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 120.
Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophid, Crickle, London." Hampstead 7420.
Mann, Egerton & Co., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
Martinsyde, Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge." Woking 331; Byfleet 171.
National Aircraft Co., Ltd., 15, Hackney Road, N.E.2. London Wall 6745.
"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London." Willesden 2435.
Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 38.
The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis, London." Putney 2240-2241.
Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester." City 8530-8531, Manchester.
Sage, Frederick & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes." Cowes 193.
Short Bros., Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London." Regent 378.
Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston." Kingston 744.
Standard Aircraft Manufacturing Co., Effingham House, Arundel Street, W.C.2. "Gunsignrush, Estrand, London." City 89.
Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickerfyta, Knights, London." Kensington 6810.
Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.
White, J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes." Cowes 3.

Airships—

Airships, Ltd., High Street, Merton. Wimbledon 1314.
Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, 'Phone, London." Regent 378.

Aluminium Castings—

Coan, R. W., 219, Goswell Road, London, E.C.1 "Krankases, Isling, London." City 3846

Bearings (Etonia Cast Phosphor Bronze)—

Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3927.

Brass Sheets for Tipping Propellers—

Lucraft, H., & Co., 147, Fenchurch Street, London, E.C.3. "Lucraftia, London." Avenue 2217.
Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 995, 996, and 7006.

Buildings—

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation Norwich." Norwich 851.
Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
The Wattle Co., Ltd., Salisbury House, London Wall, E.C.2. "Wrathless, Phone, London." City 2681-2

Cable Coverings and Cable Controls—

Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Capstan Work—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Carburettors—

Hobson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.

Casein—

Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3. "Suric den, London." Avenue 34 and 35.

Castings—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Lucraft, H., & Co., 147, Fenchurch Street, London, E.C.3. "Lucraftia, London." Avenue 2217.

Castings (Aluminium, Brass, Bronze, Machined or Rough)—

Coan, R. W., 219, Goswell Road, London, E.C.1. "Krankases, Isling, London." City 3846.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Celluloid (Non-Flam.)—

Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7.
London Label Co., Beckton Road, E.16. "Lonlabel, Canning, London." East 1300.

Clothing—

Burberry's, Ltd., Haymarket, S.W.1. Regent 2165.
Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6.
Hazel & Co., 4, Princes Street, Hanover Square, W.1. Mayfair 4071-2.
Robinson & Cleaver, Ltd., Regent Street, London, W.1. Gerrard 1070.

Component Parts—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (4 lines).
B. D. V. Aircraft Spares, Syon Chambers, 161, Kew Road, Richmond, Surrey. "Aeros, Richmond." Richmond 1681.
Central Aircraft Co., Palmerston Works, High Rd., Kilburn, N.W.6. Hampstead, 4728.
The Aircraft Construction Co., Hanley Works, Beckton Road, E.16. "Aeracraons, Canning, London." East 1300.
The Osborne Aircraft Co., Ltd., Whin Hill, Greenock, Scotland. "Cordage, Greenock." Greenock 618.

Cords, Tapes, and Threads—

MacLennan, J., & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.

Dopes—

British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312.
British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellulate, London." Regent 4046.
Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawb, London." London Wall 5350-3622.
Clark, Robert, Ingham & Co., Ltd., Caxton House, S.W.1. "Pearline, Vic, London." Victoria 2023.

Electrical Accessories—

Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London" Central 2207, London Wall 1564.
Mann, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston Road, London." Museum 70.
Premier Electric Heaters, Ltd., 258, 259, and 360, Bradford Street, Birmingham. "Fahrenheit, Birmingham." Midland 981.

Electric Cables—

E. Kalker & Co., Coventry. "Kalker, Coventry." Coventry 24x.
Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 1564.

Electric Lighting and Power—

E. Stanley Fardon, A.M.I.E.E., 67, Mosley Street, Manchester.
Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 1564.

Engines and Parts—

Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford. "Pump, Bedford." Bedford No. 1.
Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.
The Beatty School of Flying, Ltd., The Broadway, Cricklewood, N.W.2. Hampstead 3000.
Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London." Gerrard 238.
Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London S.W.1. "Aeroflight, Vic, London." Vic 7026.
Gordon Watney & Co., Ltd., Weybridge. "Mercedès, Weybridge." Weybridge 550 (7 lines).
Green Engine Co., Ltd., Twickenham. Richmond 1293.

Engines and Parts (*continued*)

Gwynnes, Ltd., Hammersmith Iron W... Hammersmith, W. "Gwynne, Hammersmith." Hammersmith
Napier & Son, D., Ltd., 14 New Burlington... London, W., and at ...cton, W. "Napier, London" Gerrard
Rolls-Royce, Ltd., 14 and 15, Conduit St., ... "Rolhead, London." Gerrard 165
The Selsdon Aero & Engineering Co., ... Imperial House, Kingsway, W.C.2. Regent
Sturtevant, B. F., Co., Ltd., Hyde Park, Bo... U.S.A.
Sunbeam Motor Car Co., Ltd., Wolverham... "Moorfield, Wolverhampton." Wolverhampton
The Gnôme & Le Rhône Engine Co., ... 47, Victoria Street, S.W. "Eleve... London." Walthamstow 408 (2 l...

Flare Lights—

Imperial Light, Ltd., 123, Victoria Street, ... don, S.W.1. "Edibrac, 'Phone, Lon... 3540 Victoria (3 l...

Flexible Shafts—

Herbert Terry & Sons, Ltd., Red... "Springs, Redditch." Redditch

Flying Schools—

Bournemouth Aviation Co., Ltd., Talbot ...lage, Bournemouth. "Eiches, Winton Bournemouth

Furniture (Office)—

Cooke's (Finsbury), Ltd., Finsbury Pave... House, London, E.C.2. London Wall 573 and

Galvanising—

Boulton & Paul, Ltd., Rose Lane W... Norwich. "Aviation, Norwich." Norwic...
Cowper-Coles Manufacturing Co., Sunbur... Thames. Sunbur...

Gears—

Moss Gear Co., Ltd., Thomas Street, A... Birmingham. "Mosgear, Birmingham East

Glue—

Improved Liquid Glues Co., Ltd., Gt. H... tage Street, E. (Croid.). "Excre... Wapp, London." Avenue
Mendine Co., 8, Arthur Street, E.C. Bank

Goggles—

Triplex Safety Glass Co., Ltd., 1, Alber... Street, Piccadilly, W.1. "Shatterlys... London." Regent

Heating and Ventilating—

Chas. P. Kinnell & Co., Ltd., 65 & ... Southwark Street, London, S.E.1. "Ki... London." Hop 372 (2 l...

Instruments—

British Wright Co., Ltd., 33, Chancery ... W.C.2. Holborn

Instruments (Scientific, ... meters, etc.)—

The Cambridge Scientific Instrument Co., ... Cambridge "Instrument, Cambridge. Cambridge
Short & Mason, Ltd., Macdonald ... Walthamstow, E.17. "Aneroid, P... London." Walthamstow

Machine Tools—

Brewster & Co., 11, Queen Victoria St... E.C.4. "Circumfuse, Cannon, Londo... City

Magneto Driving Pieces—

Herbert Terry & Sons, Ltd., Red... "Springs, Redditch." Redditch

Magnetos—

The M-L Magneto Syndicate, Ltd., Vi... Works, Coventry. "Corlton, Coventry Coventry 1008.
The British Lighting & Ignition Co., ... 204, Tottenham Court Road, W.1. "... ming, Phone London." Museum

Metal Manufacturers—

Clifford, Chas., & Sons, Ltd., Birming... "Clifford, Birmingham." Central

Metals in General—

Samuel Mercer & Co., 198, Upper Th... Street, E.C.4. "Reconciled Cannon, ... don." City
Pritt & Co., 46, Fenchurch Street, Lo... E.C.3 "Poetry, Fen, London." Avenue 995, 996, and

Metal Parts and Fittings—

Accles & Pollock, Ltd., Oldbury, Birming... "Accles, Oldbury." Oldbury 111 (3 l...
Aircraft Supplies Co., Ltd., Ascot House, ... Long Acre, W.C.2. "Upcast, R... London." Gerrard 276 (2 l...
Arnott & Harrison, Ltd., Hythe Road, W... den Junction. Willesden
Bayliss, Jones & Bayliss, Ltd., Wolverham... (Bolts and Nuts.) "Bayliss, Wolverh... ton." Wolverhampton
The Birmingham Guild, Ltd., 45, Gt. Ch... Street, Birmingham. "Handicraft." Central
Blackburn Aeroplane & Motor Co., ... Olympia, Leeds. "Propellors, Leeds" Roundhay 345 (3 l...
The British Gold Shell Ring Co., Ltd., ... ness Road, Hounslow, London. "Gol... Hounslow." Hounslow

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tal Parts and Fittings (*contd.*)—

British Metal (Kingston), Ltd., Kingston-on-Thames.
Mann, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston-road, London." Museum 70.
Mountford, Fredk., Ltd., Fremo Works, Lifford, Birmingham "Fremo, Birmingham." Kings Norton 261.
Rubery, Owen, & Co., Ltd., Darlaston. "Roofs, Darlaston." Darlaston 87.
Sankey, Joseph, & Sons, Ltd., Wellington, Shropshire. "Sankey, Wellington, Salop." Wellington 66.
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.
The Aircraft Construction Co., Harlev Works, Beckton Road, E.16. "Aercracons, Canning, London" East 1300.
Thompson Bros., Ltd., Bradley, Bilston. "Thompson Bros., Bilston." Bilston 10.
Wooler Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10.

tal Shearing Tools—

Montgomery, Smith, & Co., Ltd., Tangent Works, Keynsham, near Bristol. "Ingenuity, Saltford." Keynsham 21.

tal Spinnings—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

tric Bolts—

Ashmore Bros., Zota Works, Hildreth Street, Balham, S.W. Battersea 415.
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

scellaneous—

Anderson, D., & Son, Ltd (Roofs), Belfast. "Anderson, Belfast." Belfast 4033-4034-4035.
Anti-Glare Glass Co., Ltd., 76, Turnmill Street, E.C. Central 3731.
Bowden Wire, Ltd., Willesden Junction, N.W. "Bowirelim, Harles, London." Willesden 2400 (3 lines).
British Metal (Kingston), Ltd., Kingston-on-Thames.
Brown Bros., Ltd., Great Eastern Street, E.C.1. "Imbrowned, Bethroad, London." London Wall 6200.
Celluloid Manufacturing Co., Ltd., 61½, Fore Street, London, E.C.2. Labels in Metal, Ivory, Ivorine, etc.
Herbert Frood Co., Ltd., Chapel-en-le-Frith. "Frodobrake, Birmingham" Central 703.
Lasso Manufacturing Co., Ltd., 211, City Road, E.C. City 6558.
London Label Co., Ltd., Harley Works, Beckton Road E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.
MacLennan, J., & Co., 30, Newgate Street, E.C.1., and at Glasgow. Tapes, Cords and Threads. City 3115.

tor Cars—

Carrol Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.
Mann, Egerton & Co., Ltd., 379/381, Euston Road, London, N.W.1. "Manegear, Euston-road, London." Museum 70.
Standard Motor Car Co., Coventry. "Flywheel, Coventry." Coventry 530 (4 lines).

meplates and Labels—

British Metal (Kingston), Ltd., Kingston-on-Thames
Celluloid Manufacturing Co., Ltd., 61½, Fore Street, London, E.C.2.
The Clegg Metal Engraving Co., Chatsworth Works, Worthing. "Clegg Worthing."

servation Panels—

Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

achutes—

R. Calthrop's Aerial Patents, Ltd., Eldon Street House, Eldon Street, London, E.C. "Savemalivo, Ave, London." London Wall 3266-3267.

ent Agents—

Kings Patent Agency, 165, Queen Victoria Street, E.C.4. Central 682.
Page & Rowlinson, 27, Chancery Lane, E.C.4. Central 332.
Stanley Popplewell & Co., 38, Chancery Lane, W.C. Central 1763.

tern Making—

Fredk. Ward, 6, 7 and 8, Allsop Street, Upper Baker Street, W. Padd 4743.

rol Storage (Bulk)—

Bywater & Co. (The Hydraulic System), Craven House, Kingsway, London, W.C.2. "Bywaterist, London." Gerrard 2220.

ton Rings—

British Chuck & Piston Ring Co., Coventry. "Rings, Coventry." Coventry 723.

ver Presses and Dies—

Bliss, E. W., & Co., 24, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon, London." Hop 4340.

sswork—

Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch" Redditch 61.

Propellers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851
Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.
Integral Propeller Co., Ltd. "Aviprop, Hyde, London." Hendon 9. Kingsbury 104.
Lang Propeller, Ltd., Weybridge. "Aerosticks, Weybridge." Weybridge 520-521.
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich" Norwich 482 (4 lines).
Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 291, Leeds.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

Rigging for Aircraft—

Cradock, G., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466. Enfield 520 (6 lines).

Rubber Tubing & Accessories—

Hancock James Lyn, Ltd, 266, Goswell Rd., London, E.C.1. "Masticater, Isling, London." City 3811 and 3812.

Safety Belts—

Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.

Sand and Die Castings—

Coan, R. W., 219, Goswell Road, London, E.C. "Krankises, Isling, London." City 3846.

Scientific Instruments—

The Foster Instrument Co., Letchworth, Herts. "Instrument, Leeds." Chapeltown 474.

Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay, 345 (3 lines).
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motocs, Norwich." Norwich 482 (4 lines).
The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 18.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Short Bros., Rochester. "Seaplanes, Rochester" Chatham 627.
Supermarine Aviation Co., Ltd., Southampton "Supermarine, Southampton." Southampton 1537.

Searchlights and Landing Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Seats for Aeroplanes—

Bowsers, Art Cane Works, 50 Park Lane, Leeds. Central 3437.

Shackles—

The British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow. "Golshel, Hounslow." Hounslow 254.

Sheet Metal Pressings—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.
W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk, Bham." Central 550.
British Metal (Kingston), Ltd., Kingston-on-Thames.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 407 Birmingham.
Nicholls & Lewis, Ltd., 16, Princep Street, Birmingham. "Colpressed, Birmingham." Central 7188.
Rubery Owen & Co., Darlaston, South Staffs "Roofs, Darlaston." Darlaston 87 (3 lines)

Sheet Metal Work— Thames.

British Metal (Kingston), Ltd., Kingston-on-
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.

Shock Absorbers (Elastic Cord)—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128

Sparking Plugs—

Forward Motor Co., Summer Row, Birmingham. Central 6259.
Hobson Manufacturing Co, 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.
Lodge Sparking Plug Co., Ltd., Rugby. "Igniter, Rugby." Rugby 235.
Ripault, Leo, & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758.

Springs—

Dart Spring Co., West Bromwich. "Dart, West Bromwich." West Bromwich 322
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Steel—

Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237.
Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham." Smithwick 224.

Steel Tension Wires—

Cradock, G., & Co., Ltd., Wakefield. "Cradock, Wakefield." Wakefield 466 (3 lines).

Steel Tubes for Aeroplanes—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Taper Pins—

Mountford, Fredk. (Birmingham), Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262

Tapes and Smallwares—

MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow City 3115.
James North Hardy & Son, Ltd., 54, Portland Street, Manchester "Hardson, Manchester." Central 6471.

Timber—

Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Entikosil, Vic, London." Victoria 5073, 4210.
Brown, R. F., & F. W., Wollaton Saw Mills, near Nottingham. "Brown's Saw Mills, Wollaton." Nottingham 1526.
J. Owen & Sons, Ltd., 199a, Borough High Street, S.E.1. "Bucheron, London."

Time Recorders— Hop 3811 (2 lines).

Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310

Turnbuckles—

Rubery Owen & Co., Darlaston, South Staffs "Roofs, Darlaston." Darlaston 87 (3 lines)

Tyres and Wheels—

The Palmer Tyre, Ltd., Shaftesbury Avenue "Tyricord, Westcent." Gerrard 1214 (4 lines)

Varnishes—

Clark, R. Ingham, & Co., Caxton House, S.W.1. "Pearline, Vic, London Victoria 2023
Harland, W., & Son, Merton, London, S.W.19 "Harland, Wimbledon 45." Wimbledon 45 and 1395
Naylor Bros., Ltd., Southall, Middlesex "Naylor, Southall." Southall 30.

Washers—

Herbert Terry & Sons, Ltd. Redditch. "Springs, Redditch" Redditch 61

Watchmakers and Jewellers (Silver Models)—

Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 8001 (3 lines).

Welding and Cutting Plant—

Imperial Light, Ltd., 123 Victoria Street, London, S.W.1. "Edibrac, 'Phone, London" 3540 Victoria (3 lines).

Welding Repairs—

Barimar, Ltd., 10, Poland Street, W.1. "Barquamar, Reg, London" Gerrard 2813
Imperial Light, Ltd, 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Wind Shields—

Auster, Ltd., 133, Long Acre, W.C "Windflector, London." Regent 5910.
London Label Co., Ltd, Hadley Works, Beckton Road, E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1 "Shatterlys, Piccy, London." Regent 1340.

Wire Gauze—

N. Greening & Son, Ltd., 16, Finsbury Street, London, E.C. "Setscrew, Finsquare, London." London Wall 1082.

Wires and Cables (Aeroplanes)—

Bruntons, Musselburgh, Scotland "Wiremill, Musselburgh." Musselburgh 28.
Cradock, Geo., & Co., Ltd., Wakefield. "Cradock, Wakefield." Wakefield 466 (3 lines).

Wirework—

Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Woodworking Machinery—

Robinson, Thomas, & Son, Ltd., Railway Works, Rochdale. "Robinson, Rochdale." Rochdale 467.
Sagar, J., & Co., Ltd., Halifax. "Sawtooth, Halifax." Halifax 136.
Wadkin & Co., Leicester. "Woodworker, Leicester." Leicester 1614.

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Acetylene Welding Plant—
Acetylene Corporation of Great Britain, Ltd., 14a, Victoria Street, Westminster, Lng. 4th. Victoria 3837. S.W.1. "Flamma, Vic, London." Vic 4830.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, Phone, London." 3549 Victoria 13 lines.

Aeroplane Manufacturers—
Aircraft Manufacturing Co., Ltd., Hendon. "Airmanship, Hyde, London." Kingsbury 180.
Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne." Lincoln 3 or Newcastle-on-Tyne.
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.
British & Colonial Aeroplane Co., Ltd., 154, Bristol. "Aeroplane, Bristol." Bristol 906.
British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudropton, Cricklewood, London." Hampstead 5550.
Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6. Hampstead 1393 and 4393.
Davidson Aviation Co., Ltd., Hammersmith, W.6. "Davidson, Hammersmith 1444-1445
Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1076.
Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 120.
Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophil, Crickle, London." Hampstead 7220.
Mann, Egerton & Co., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
Martinsyde, Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge." Weybridge 450, Byfleet 171.
National Aircraft Co., Ltd., 15, Hatton Rd., N.E.2. London Wall 6755
"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuwoud, Crickle, London." Willesden 2455
Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 18.
The Royal Aircraft Co., Ltd., 120-132, New Kings Road, Fulham, S.W.6. "Carbolic, London" Putney 2249-2241
Ros, A. V., & Co., Ltd., Manchester. "Triplane, Manchester."
Sage, Frederick & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128
Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes." Cowes 161
Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, Phone, London." Regent 378.
Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston." Kingston 744
Standard Aircraft Manufacturing Co., Effingham House, Arundel Street, W.C.2. "Gunsightush, Estrand, London." City 80.
Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickerlsto, Knights London." Kensington 6840.
Waring & Gillow, Ltd., Hammersmith. "Warisen, Os, London." Museum 5000.
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White J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes" Cowes 3.

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Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313
Robery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
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Central Aircraft Co., Palmerston Works, High Rd., Kilburn, N.W.6. Hampstead, 4728.
The Aircraft Construction Co., Hayes Works, Beckton Road, E.16. "Aerocurtis, Canning, London" East 1300.
The Osborne Aircraft Co., Ltd., Albion Hill, Greenock, Scotland. "Cockleg, Greenock." Greenock 618.

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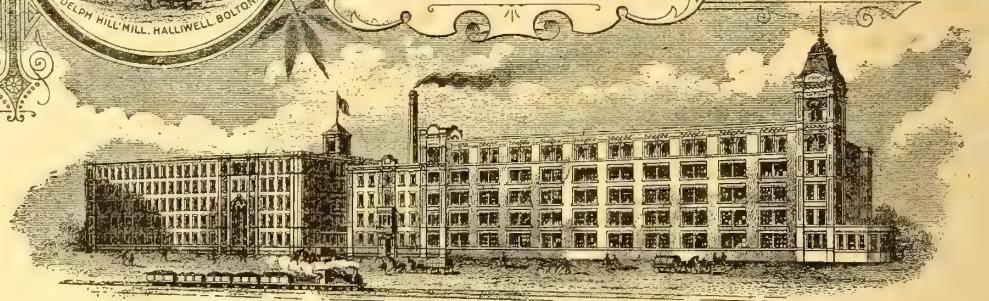
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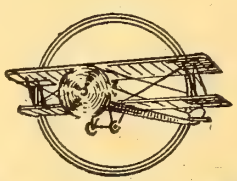




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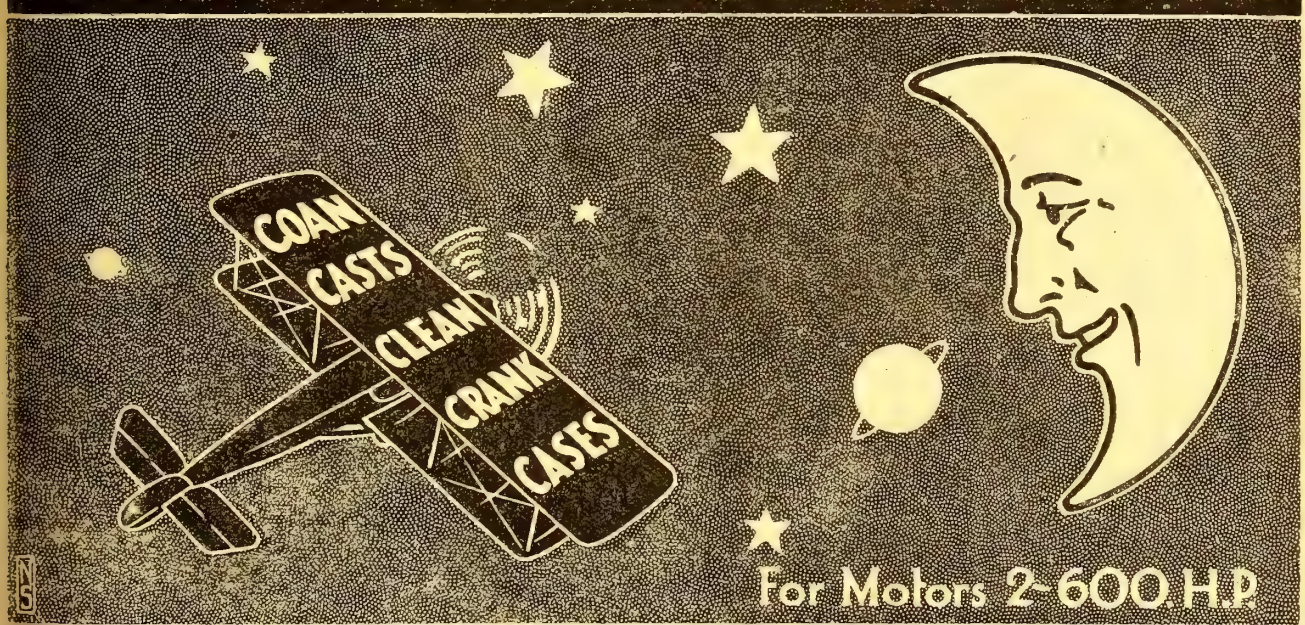
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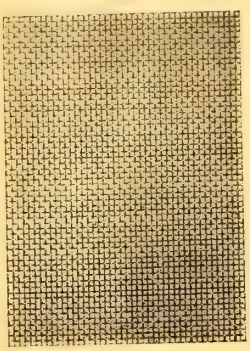
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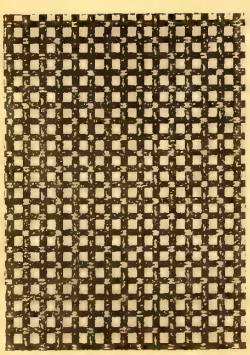
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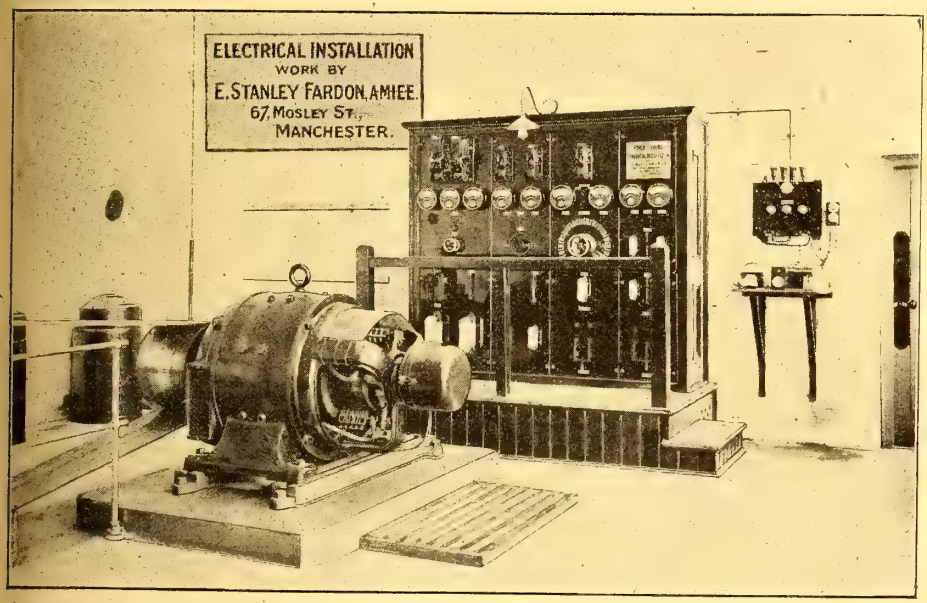
47, VICTORIA STREET, S.W.1., and THE HYDE, HENDON, N.W.9.

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MODERN ELECTRICAL EQUIPMENT.

One of the most important factors in the efficient output of a factory is its electric lighting and power equipment. Unless this is modern and on the best basis it is impossible to obtain the maximum result from wages paid.

In this connection the experiments, observations and study made in aeroplane and engineering workshops, combined with a long and wide experience in designing and erecting such installations, places Mr. E. Stanley Fardon, A.M.I.E.E., of 67, Mosley Street, Manchester, in the position of a leading authority on such matters.



A neat generating plant laid down at a well-known South Coast aircraft works by Mr. E. Stanley Fardon, A.M.I.E.E. The prime mover is a producer-gas engine, run almost entirely on wood waste from the works.

By a long and gradual process of experiments, elimination and evolution, Mr. Fardon has sifted out and placed on a definite and scientific basis the best possible system of electric lighting, heating, and power equipment for aeroplane and engineering works, whilst many of the principles on which he works apply equally well to private houses or business establishments, institutions, etc.

Chief amongst several recently invented specialities, Mr. Fardon strongly advocates a new system of fittings for machine tool lighting, by means of which the consumption of current can generally be reduced by from 50 per cent. to 75 per cent, the cost of electric lamp renewals halved, and the efficiency and output of the machines greatly increased with less strain on the operators' eyes.

Another recent invention for which Mr. Fardon has been appointed agent is a new system of electric heating possessing many advantages in efficiency and economy over any existing system, thereby making a very big stride towards putting electric heating on the footing of a commercial possibility, which up to now it has not been, owing to the prohibitive cost.

Mr. Fardon undertakes commissions and contracts in any part of the country, and will be very pleased to call and discuss and advise on these matters with anyone interested, and to point out how improvements can be made to increase output and efficiency.

It should be noted that Mr. Fardon is prepared to design, erect, and be entirely responsible for complete equipments, consisting of engines, generating plant, batteries, wiring, lights, power, heating, cooking and ventilating apparatus, besides internal bells, telephones and alarm signals, and enquiries respecting work of this description will receive prompt attention.

AN EXCHANGE OF COMPLIMENTS.

In connection with the non-stop flight from Turin to London, accomplished by Captain Laureati, on a Sia biplane, with Fiat engine, letters of congratulation have been received by Signor Cavaliere Agnelli, Managing Director of the Fiat Company, from Lord Cromer, on behalf of His Majesty the King, from Lord Derby, from the Right Hon. A. J. Balfour, and from the Lord Mayor of London. The President of the Aero Club of Italy has also sent a congratulatory message, and announces that the Club has conferred its gold medal on Captain Laureati and the Sia Company.

The letter on behalf of His Majesty the King is as follows:—

"To Signor Cavaliere C. G. Agnelli, Fiat Company, Turin.

"Sir,—I am commanded by His Majesty the King to thank you for the terms of your message of greeting, which was conveyed in your letter of Sept. 22nd, from Italy to England, by an aeroplane of which your firm are the constructors. I am to convey His Majesty's congratulations on the accomplishment of such a feat so full of promise for the progress of the aerial activities of Italy and her Allies.

"(Signed) CROMER."

Lord Derby wrote as follows:—

"May I thank you for your most courteous letter and offer my sincere congratulations to you and the whole Italian Air Service on the magnificent feat of skill and endurance which two of its members have accomplished. It is yet another token of the glorious spirit which animates the great Italian army and of the bond of sympathy which unites the two nations against the common enemy and will in due time bring the final victory.

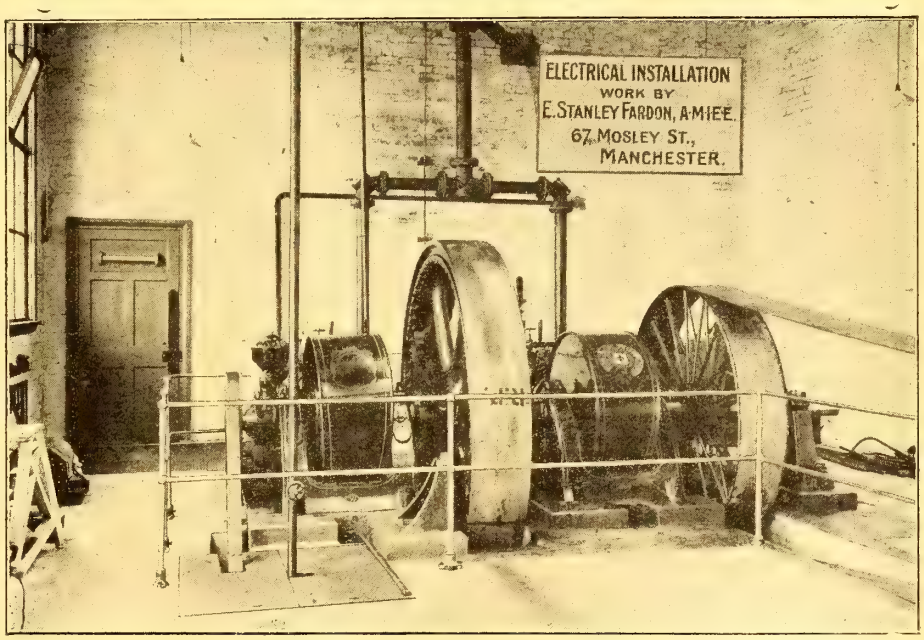
"(Signed) DERBY."

TWO NEW AMERICAN MOVES.

The Weger Aeronautical Company, of Cleveland, has been incorpated with a capital of $200,000. Mr. A. L. Hammink is to be president, Mr. C. B. Cortlett is vice-president, and Mr. S. G. Fleisher secretary and treasurer. Contracts for aircraft engines will be put in hand forthwith.

* * *

The Arnold Stelling Co., Inc., distributors of Simplex cars, has taken over a plant at San Francisco, Cal., for the construction of aeroplanes. The factory was originally the property of the late Silas Christoffersen.



Another Fardon Electric Installation, at the works of A. V. Roe and Co., Ltd. The dynamo is driven by a producer-gas plant.

PATENTS INDEX.

The subjoined list of recent inventions has been specially compiled by THE AEROPLANE from the current Official Patents Records.

PATENT APPLICATIONS.

Baxter, A. W. Fire-resisting fabric for aeroplanes, etc. No. 15937. Nov. 1st.

Blackburn Aeroplane & Motor Co. Carrying weights, such as merchandise, petrol, etc., on aeroplanes. No. 15879. Oct. 31st.

Bloxam, A. G. Aircraft propellers. No. 15746. Oct. 29th.

Dent, F. H. Aeroplanes. No. 16027. Nov. 2nd.

Donkin, J. Aeroplane, etc., propellers. No. 15929. Nov. 1st.

Heygate, W. S. Illuminating device for detection of aircraft. No. 15765. Oct. 29th.

Hollister, F. J. S. Telescopic aneroid sight for aircraft. No. 16000. Nov. 2nd.

Homer, E. Angle-indicator for use on aircraft, etc. No. 15770. Oct. 29th.

Hurst, B. L. Collapsible screens or coverings for openings in hangars, etc. No. 15997. Nov. 2nd.

Kent, A. F. S. Devise to diminish visibility of aircraft, etc. No. 16049 Nov. 3rd.

Robson, J. Lifting or propelling wheel for ships, etc., or aircraft. No. 15703. Oct. 29th.

Swain, W. F. Flying-machines. No. 15851. Oct. 31st.

Wolff, A. Aeroplane speed-accelerator. No. 16057. Nov. 3rd.

COMPLETE SPECIFICATIONS ACCEPTED, PRINTS OF WHICH CAN BE OBTAINED ON AND AFTER NOVEMBER 22ND, 1917.

110562. Sept. 14th, 1916. Brooke, T. P. Flying-boats.

110564. Sept. 22nd, 1916. Starling, S.G., Hughes, A. J., and Hughes & Son, H. Apparatus for measuring the tilt or radial acceleration during turning movements of aeronautical machines, and for compensating the effects of such tilt or acceleration on compasses.

110614. Oct. 28th, 1916. Aeronautical Instrument Co., and Brewer, G. Adjustable marks or scales for aneroids, air-speed indicators, magnetic compasses, and other dial instruments.

110623. Nov. 3rd, 1916. Kennedy, C. W., and Jackson, W. Clinometers for use on aircraft.

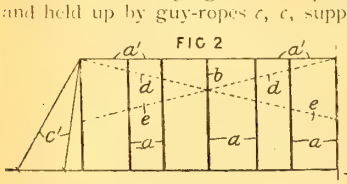
110668. Jan. 16th, 1917. Muller, J. P. Automatic marine life-saving apparatus, means for supporting flying-machines on water, and floating buoys discharged from guns.

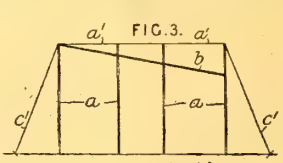
110720. June 12th, 1917. Aeronautical Instrument Co., and Brewer, G. Apparatus for producing a suction or pressure effect.

ABRIDGMENTS OF RECENTLY PUBLISHED SPECIFICATIONS.

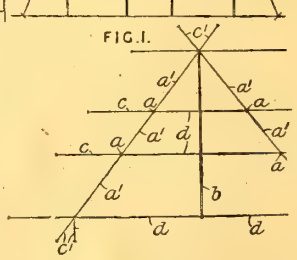
109,279. Shelters for aircraft. SAVOURS, W. M., Woodlands, St. Martin's Road, Caerphilly, Glamorganshire.

The Figures present respectively plan, front, elevation, and side view. Two diverging rows of posts *a*, connected by top ties a^1 and held up by guy-ropes *c*, *c*, support canvas walls and the outer



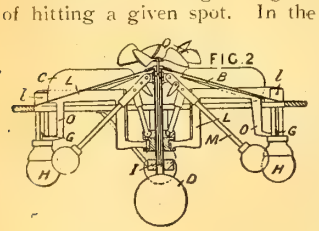


edges of a roof sheet. The middle of the roof sheet is carried by a spar *b*, which, with one end attached to the rear post, is slung and kept immovable by means of upper and lower cross-ties *d*, *e* in the planes determined by opposite posts. In a modification, the rows of posts may be parallel.



109,327. Aerial warfare. BRUNESSAUX, A. H., 8B, Vicarage Parade, West Green Road, Tottenham, and IREDALE, G., 349, High Street, Ponders End, both in London.

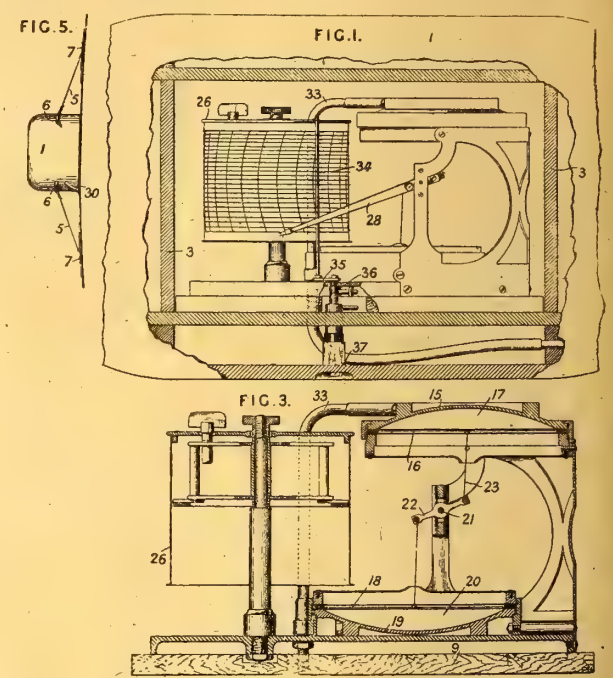
Consists in dropping from aircraft a main bomb together with a number of auxiliary bombs, which are released from the main bomb before striking the ground, thus increasing the chances of hitting a given spot. In the form shown, the main bomb D is carried by a parachute B provided with vanes C adjacent openings in the parachute for rotating the apparatus during its fall. A vane-wheel Q is extended rearwards, as the apparatus begins to fall, and, in the extended position, becomes locked to the parachute and helps to rotate it. When the apparatus



acquires a certain speed of rotation, centrifugal weighted arms M swing out, raising a sleeve I, which rocks levers L pivoted at *l*, withdrawing arms O from hooks G on the auxiliary bombs H. These bombs, when thus released from their holding-frames, separate out under the influence of centrifugal force.

109,365. Pressure gauges. AERONAUTICAL INSTRUMENT CO. and BREWER, G., 33, Chancery Lane, London.

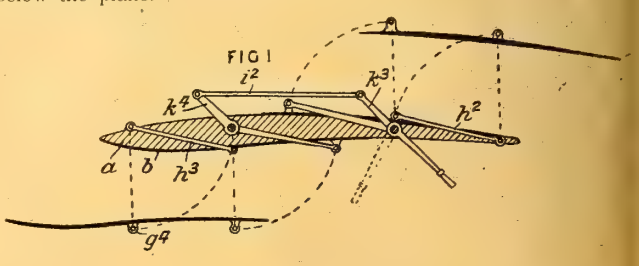
Apparatus for recording small differences of pressure between the gas contents of an aerostat and the surrounding atmosphere comprises a wooden casing 1 having a flat side adapted to lie against the surface of an aerostat and formed with rounded ends. An internal casing 3, provided in the outer one, communicates with the atmosphere by an aperture. Mounted in the casing upon a base 9 are chambers 17, 20, Fig. 3, enclosed on one side by cup-shaped members 15, 19, and on the other by flexible

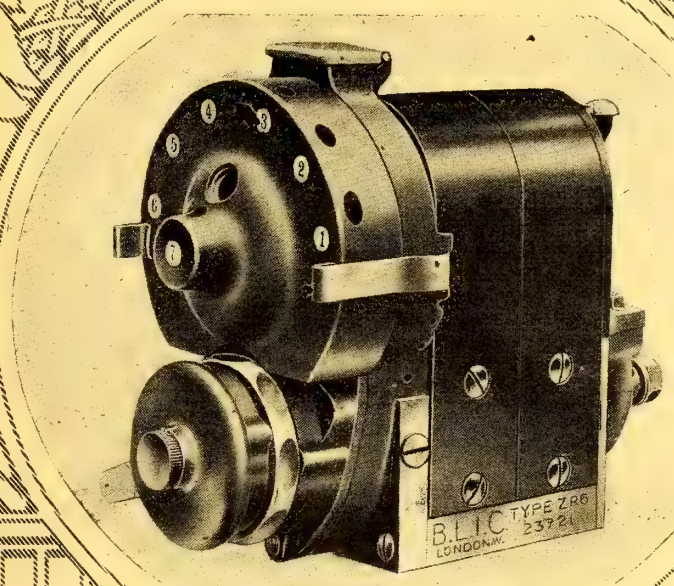


diaphragms 16, 18. The chambers are connected by tubes 33, 30 to the interior of the aerostat and movement of the diaphragms due to pressure differences is communicated to a flexible recording arm 28, moving over a clock-driven record drum 26, by a shaft 21, a lever 22 on which is connected by stiff wires 23 to the diaphragms. The recording arm may be moved to an inoperative position by a bar 34 carried by a crank 35, the shaft 36 of which may be rocked from the exterior by a handle 37. A window is provided to allow the record to be viewed. The device is secured to patches 7 on the aerostat by flexible connections 5 passing through rings 6 on the casing. Specification 13796/13 is referred to.

109,335. Aeronautics. MOLESWORTH, H. B., Manor House, Bexley, Kent.

STEERING AND BALANCING; PLANES, CONSTRUCTION AND ARRANGEMENT OF.—In means for varying the speed of aeroplanes by altering the area of the main planes, the alteration of area is effected by means of subsidiary aerofoils arranged to be collapsed onto the main planes both above and below. Fig. 1 shows a main plane *a* fitted with subsidiary aerofoils *b* which are shaped to fit closely above and below the plane and may be opened out parallel thereto. The aerofoils are connected to the plane by links h^2, h^3 and are operated by means of a handle and levers k^3, k^4 connected by a link i^2. In a modification, the upper aerofoil moves forwards, and the lower one rearwards, during the opening movement. In another form, series of aerofoils are arranged to be opened out one above the other both above and below the plane.





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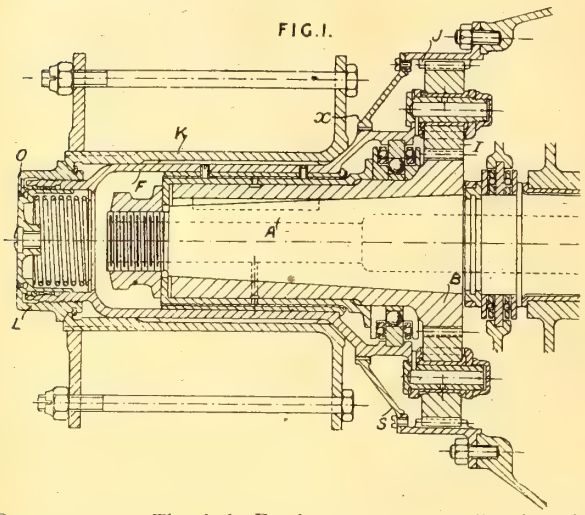
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109,437. Internal-combustion engines; aeronautics. SOC. LORRAINE DES ANCIENS ETABLISSEMENTS DE DIETRICH ET CIE DE LUNEVILLE, 40, Rue du Colisée, Paris. Convention date August 16th, 1916. Not yet accepted. Abridged as open to inspection under Sect. 91 of the Act.

FIG. 1.



DRIVING-GEAR.—The hub F of a rotary propeller is driven from a motor shaft A by planetary pinions I which gear with a wheel B on the shaft A and a fixed wheel J on the motor casing. The hub F has a series of longitudinal projections which engage corresponding recesses in a false hub K carrying the propeller. The false hub is secured in position by a nut L which is locked by a spring-pressed cap O adapted to slide in and rotate with the hub F and having teeth *o* which engage recesses in the nut L. A thread *x* on the sleeve F prevents leakage of lubricating oil from the stationary casing S.

AERIAL TORPEDOES.

Almost every newspaper, daily and weekly, has, during the past few weeks, declaimed broadly on the terrible potentialities of what it calls German aerial torpedoes, and such extremely alarmist statements have been made in certain quarters that it seems well to repeat what has already been said in THE AEROPLANE, namely, that there is not the slightest reason to believe that such things exist. As a matter of fact, one evening paper recently went to the length of warning its readers that enemy aircraft could fire an aerial torpedo so long a distance as ten miles, and that, therefore, people could not consider themselves safe even should there be no machines directly overhead, and no consequent anti-aircraft fire.

The aerial torpedo might conceivably be very useful if it could be designed in a form which was both economical in weight and space, but, perhaps fortunately, from our point of view, such a thing is impracticable.

A torpedo is essentially a self-propelled and self-sustained missile, capable of travelling on a horizontal or parabolic path, in order that it may strike some object in an approximately horizontal sense, as in the case of a marine torpedo. The only convenient way of making an aerial torpedo would be to construct a miniature aeroplane which would glide along an inclined path to the ground.

In that case any mechanical propulsive power would be quite unnecessary, as the apparatus would travel forward impelled by gravity. There is one alternative, and that is to attach a heavy bomb to a miniature airship and to drive this contrivance in an inclined direction by means of some motive power. Both these propositions are, however, impracticable, owing to their great bulk. It would also be impossible to aim them at any definite target, and they would merely travel downwards until they struck some object such as the ground, the side of a house, or the like, in an entirely promiscuous manner.

The particular kind of missile, which the public and the Press call an aerial torpedo, is nothing more nor less than a large streamlined bomb, fitted with fins at its hinder-end, to give it a measure of stability, to increase its speed, and to ensure its *vertical* drop. The fins on the tail hold the end of the torpedo vertically above the nose. The streamlined shape merely reduces the head resistance and increases the striking impact.

Inaccurate as the dropping of bombs may be, the use of anything in the nature of a true aerial torpedo would be far less certain, because, owing to the long period during which it would be travelling through the air, the deviation caused by inaccurate aim and variations in the wind would be correspondingly greater, and any gyroscopic control employed to ensure directional stability would not check its travel to leeward in the least.

One point which may have given rise to the belief in the self-propelled aerial torpedo is the air-screw or fan on the tail of most bombs, which is popularly believed to be the instrument which propels the torpedo along. As a matter of fact, it is nothing more nor less than a safety device, which causes the bomb only to become alive after it has fallen several hundreds of feet.

The speed of the fall through the air causes the blades of the air-screw to revolve and to unscrew a slow-speed screw-thread, which makes the detonating gear ready for action.

The outside similarity between a pukka marine torpedo and a streamlined bomb has given rise to this widespread misapprehension, and, at any rate, one has only to fear any enemy bombs which are dropped from a machine coming towards one. As soon as it is actually overhead one is safe.

A bomb dropped from a high-speed aeroplane naturally travels a certain distance in a forward direction, owing to the initial velocity with which it leaves the machine, but this in no sense entitles the missile to be described as a torpedo.



A So-called Aerial Torpedo being loaded onto a Gotha Bombing Machine.

INSUBORDINATE WORKMEN.

At the London Munitions Tribunal on Nov. 5th, the Hon. R. Talbot presiding, the Workers' Union asked that a firm should be fined £10 in respect of each of six shop stewards, aeroplane fitters, for dismissing them for taking part in a trade dispute. It was alleged that the firm introduced a flat rate, the result of which was that 50 semi-skilled fitters had their wages reduced. This was said to be in contravention of the Amended Munitions Act, and caused considerable unrest. The shop stewards, some of whom were ex-soldiers, decided that, to avoid a strike, four of their number should interview Mr. Rosenberg, their Union official, and with him see the Ministry of Munitions. The day before this a notice was put up that men losing time would be dealt with severely.

One of the four men secured permission to be absent half a day, but did not return within that time; the other three did not ask permission to be absent. Accompanied by Mr. Rosenberg, the four delegates interviewed the Ministry, who said that they would deal with the firm for lowering wages without the Ministry's assent, but advised that the new rate should be accepted for the time being.

On returning, the four men were dismissed for being absent without leave, and the other two shop stewards were among 50 men who were given a week's notice, with the option of appealing and of being taken on again at the reduced rate. A week later all these workmen, with the exception of the two stewards, were reinstated. No definite reason was given for their dismissal.

Mr. Rosenberg declared that the six fitters were dismissed simply because they had brought the trouble to the notice of the Ministry.

Mr. Morley, works manager, said it was found necessary to put up the notice, and the four men were the first to break it, and of the other two one was dismissed for general misconduct and the other for wasting time. The alterations in wages were made to conform to the revised rates. Out of 600 hands only 50—the semi-skilled fitters— had their rates reduced.

The Tribunal found that the four men who formed the deputation were dismissed improperly, as the result of the dispute, but that the other two men were not so dismissed. As it was the first case of the kind, the Court only imposed a fine of £4.

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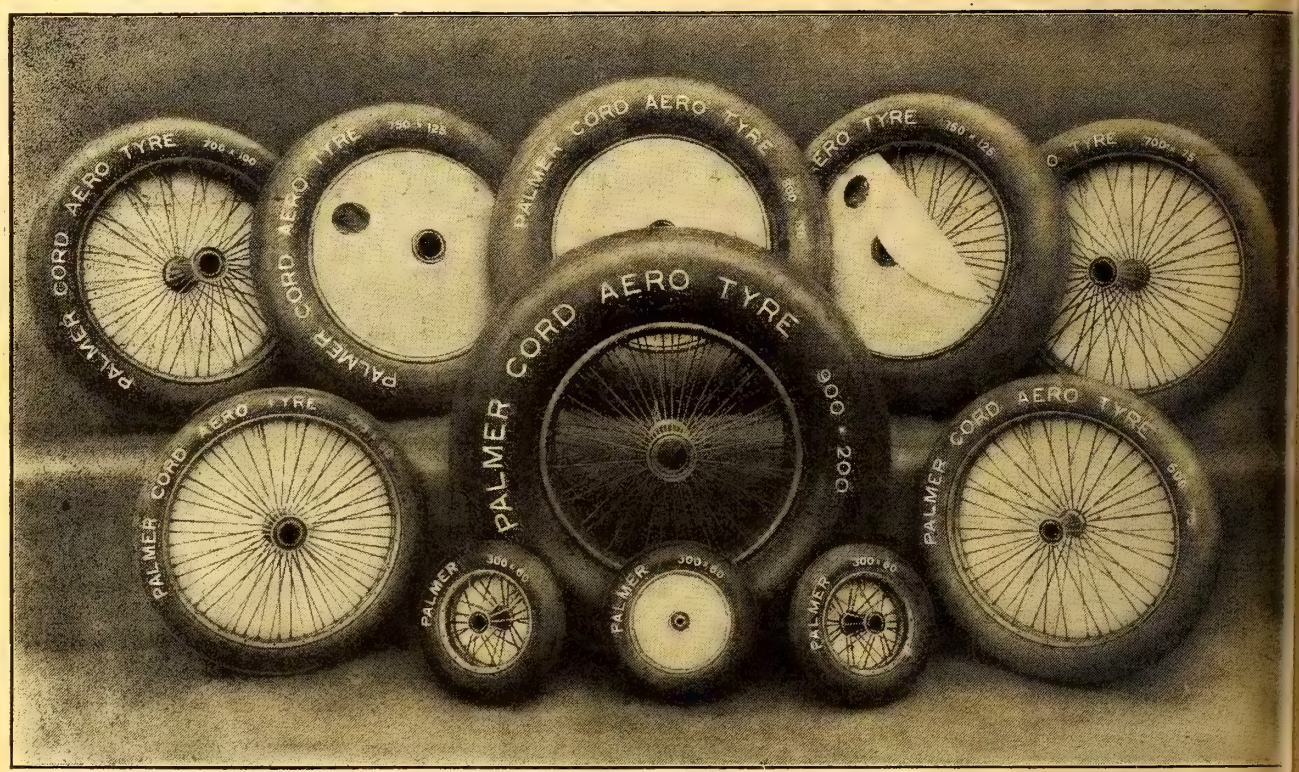
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300×60	16	111.12	25.4	Central	700×75	*80	178.	44.45	132/46	750×125	96	178.	55.	132/
,,	17	72.39	12.7	Central	,,	*91	178.	31.75	132/46	800×150	82	185.	55.	135/
450×60	30	89.	31.75	Central	,,	*98	178.	44.45	Central	,,	85	185.	55.	Cent
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,,	34	150.	31.75	104/46	,,	77	178.	44.45	132/46	1000×150	97	250.	65.4	Cent
650×65	78	178.	44.45	132/46	,,	93	150.	40.	Central	,,	102	185.	55.	125
,,	100	178.	38.09	132/46	,,	33	150.	38.09	Central	,,	201	185.	60.32	125/
,,	101	178.	31.75	132/46	,,	99	178.	38.89	132/46	900×200	39	185.	55.	Cent
600×75	111	150.	38.09	104/46	,,	96	178.	55.	132/46	,,	42	185.	60.32	125/
,,	21	160.	28.	Central	750×125	92	185.	55.	135/50	,,	47	185.	55.	125/
,,	34	150.	31.75	104/46	,,	95	185.	55.	Central	,,	202	185.	60.32	Cent
700×75	78	178.	44.45	132/46	,,	77	178.	44.45	132/46	1100×200	52	185.	55.	116/
,,	100	178.	38.09	132/46	,,	93	150.	40.	ntral	,,	57	185.	55.	Cent
,,	101	178.	31.75	132/46	,,	33	150.	38.09	Centra	,,	203	185.	60.32	116/
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Contractors to the Admiralty and to the War Office,

119, 121, 123, SHAFTESBURY AVENUE, LONDON, W.C.2.

Telegrams: "TYRICORD, WESTCENT, LONDON." Telephone: GERRARD 1214 (Five lines).

PARIS: 24, Boulevard de Villiers, Levallois-Perret.

THE AIRCRAFT TRADER

MARKET TOPICS.

Prices given are for quantities on usual terms.

Nov. 8th, 1917.

COPPER.—The latest reports received from America indicate that the labour difficulties are gradually being settled and deliveries are improving. One or two mines are now running full time and the outlook appears to be much brighter.

It is reported that the U.S. Government are still engaged on their scheme of pooling supplies, but nothing definite appears to have been settled.

The position here remains unchanged, supplies are well maintained and the official prices are unaltered.

Comparative Prices.

To-day	£110	0	0 per ton.
1916	124	0	0 per ton.
Highest Price, 1916	153	0	0 per ton.

TIN.—The Tin market is passing through a very excited time, supplies are very large and yet prices have soared to an extraordinary height, surpassing all expectations. In view of the uncertainty of supplies, prices have been fairly steady recently and an advance in price did not come as a surprise, at the same time, it was not expected that the figure would soar to £263. The three main factors responsible for the excited condition of the market are :—

(1) Increased demands here and in the East.
(2) Reluctance on the part of the sellers.
(3) Uncertainty of supplies.

As indicated last week, the prices will not decline to the low level prevailing at the beginning of October; everything points to prices remaining high for some time, although the usual fluctuations will be witnessed.

Comparative Prices.

To-day (8th Nov.)	£263	0	0
November 2nd	258	0	0
October 29th	250	0	0
October 23rd	247	0	0
October 1st	243	10	0
Highest Price, 1916	205	0	0
Average Price, 1916	182	3	5

LEAD.—There are very fair supplies of lead coming through and the output figures are very satisfactory.

STEEL.—There is still a very strong feeling that prices will soon advance. It has not yet been settled what advance will be made in the price of Coke, although it is rumoured that the Ministry have agreed to an advance of 6/4 per ton—if this is correct, it can be taken for granted that all classes of Iron will be subject to a corresponding large increase.

The output of all classes of steels is increasing very rapidly and steady supplies are being received.

The Air Board have now fixed the "maximum" prices which may be charged for Steel tubing, and the complete schedule is shown elsewhere. See Prices Current.

TIMBER.—The position is still very serious indeed, and the outlook is far from being bright; in fact, at the present time, several constructors have not a stick of Silver Spruce in the place. It will, apparently, be some time before there will be anything like considerable supplies of Silver Spruce substitutes available and it is very difficult to see any solution to this most serious problem. There is very little Walnut procurable, but Mahogany is a little easier, supplies being fairly well maintained.

FABRIC.—Another week has passed and still the Irish labour troubles are unsolved. The position is hopeless. Apparently the Government cannot settle the dispute, and, seeing that the strike has been in progress eight weeks, it is time the Air Board authorities took steps to conserve the stocks of linen fabric for fighters. Obviously this was the step which should have been taken weeks ago. There is no difficulty in obtaining Cotton Fabric, and there does not appear to be any reason why this should not be used on school machines. Practical tests prove that Cotton Fabric takes the Nitro Cellulose Dope quite well and gives a very good result. Seeing, therefore, that there are good supplies of the latter, the argument that Cotton Fabric absorbs too much Dope, of which there is a scarcity, does not hold good, as far as the new approved Dope for school machines is concerned. In any case, the main point is the conservation of our Linen Fabric stocks, and the use of Cotton Fabric for school machines appears to be the only measure which could give any effective results.

The official prices are still maintained, and although, as frequently pointed out in these columns, they are outrageously high, it is rumoured that there is the possibility of an advance; it is to be hoped that the information is not correct. See Prices Current.

CURRENT MARKET PRICES.

Nov. 8th, 1917.

The prices given below are the prices ruling on the above date.

Terms.—Usual for the various materials mentioned.

Prices of old metals are as quoted by scrap dealers.

Prices must not be taken as specific quotations for definite quantities delivered to any part of the country.

Aluminium.*	
Ingot	£225 per ton.
Remelted	£210 per ton.
Brass.	
Sheets	15⅛d. per lb.
Strip	14⅛d. per lb.
Wire	14½d. per lb.
Tubes	15¾d. per lb.
Castings	15d. per lb.
Turning Rod	14d. per lb.
Brazed Tubes	19½d. per lb.
Copper.	
Ingot, Standard, Cash	£110 per ton.*
Ingot, Standard, 3 mos.	£110 per ton.*
Best Selected (Nett)	£123 to £119 per ton.
Sheets	£150 per ton.
Wire	15¼d. per lb.
Tubes, S.D.	18½d. per lb.
Tubes, Brazed	18½d. per lb.
Rivets	1s. 10½d. per lb., basis.
Tacks	1s. 10d. per lb.
Fabric.*	
Linen, R.A.F., 17C, Spec., 36 in. wide, 2s. 8d. p. yd.	
Linen, R.A.F., 17C, Spec., 38 in. wide, 2s. 9½d. p. yd.	
Spaced, R.A.F., 17C, Spec., 37½ in. wide, 1s. 9d. p. yd.	
Gun Metal.	
Castings	1s. 8d. per lb.
Lead.*	
Virgin Pig	£29 per ton, c.i.f.
Virgin Pig	£30 per ton, ex stores.
Sheets	£39 10s. per ton, D/d.
Pipes	£40 per ton.
Dry White	£46 10s. per ton. less 5 per cent.
White in Oil	£53 per ton. (lots over 5 cwt. less 5 per. cent.)
White in Oil	£55 per ton. (lots under 5 cwt. less 5 per cent.)
Red, in Oil	£42 per ton, less 2½ per cent.
Nickel.*	
Nickel	£200 per ton.
Phosphor Bronze.	
Ingots, 5 cwt., and under	£150 to £170 per ton. (Subject to Copper and Tin Fluctuations.)
Castings	1s. 7d. to 1s. 9d. per lb.
Phosphor Copper.	
Ton lots	£200 to £205 per ton.
Silver.	
Silver	44½d. per oz.
Solder.	
Plumber's	104s.
Tinman's	135s.
Steel.*	
High Speed, 14 p. cent., Tungsten, 2s. 10d. per lb., basis.	
High Speed, 18 per cent., Tungsten, 3s. 10d. per lb., basis.	
Alloy Steels to Air Board Specifications.†	
Round and Square :—	
Specification No. S2	£86
Specification No. S2 (bright-drawn)	£115

Specification No. S8	£86
Specification No. S10	£70
Specification No. S12	£75
Specification No. S14	£43
Specification No. S15	£70
Specification No. S16	£70
Specification No. S17	£75
Specification No. S18 (oil-hardened)	£86
Specification No. K1	£75
Specification No. K2	£75
Specification No. K3	£86

The above prices are for ¼ in. to 5/16 in. only, other sizes are proportionate.

HEXAGONS.

	.455 and .525	.601 and .710
Specification S2	£79	£77
Specification S8	£79	£77
Specification S2 (bright-drawn),	£112	£112
Specification S8 (bright-drawn),	£112	£112

SPELTER.

English f.o.b., Birmingham £57

TIN.

Tin £263

TINPLATES.*

Tinplate ..... 30s., basis, f.o.t.

TIMBER.

	Official.	Merchants.
Silver Spruce, 10s. 4d.		18s., c.f.
English Ash		16s., c.f.
Mahogany, 1s. 6d. to 1s. 10d.	2s. 2d. to 2s. 6d., s.f.	
Walnut, 2s. to 2s. 3d.	2s. 3d. to 2s. 6d., s.f.	

ZINC.

Zinc Sheets (American)..... £110, f.o.b., New York.

SCRAP MATERIALS (LONDON PRICES).

ALUMINIUM.

Description.	Price per ton on sale to refiner, delivered at refinery.
Sheet cuttings and rods containing a minimum of 96 per cent. Al.	£160 0 0
Old rolled, etc., containing a minimum of 96 per cent. Al.	120 0 0
Spinnings, punchings, and thin small scrap; also painted and varnished scrap that needs melting, containing a minimum of 96 per cent. Al.	105 0 0
Lump scrap from aero castings and material of equivalent value, containing 87 to 95 per cent. Al.	100 0 0
Turnings and Swarf, generally containing 87 to 95 per cent. Al.	87 10 0
Scrap, generally containing 80 to 86 per cent. Al.	80 0 0
Swarf and inferior Swarf, generally containing 80—86 per cent. Al.	70 0 0
All Scrap, containing below 80 per cent. Al., not to exceed	65 0 0
All Swarf, containing below 80 per cent. Al., not to exceed	60 0 0
Brass, Heavy Selected	£88
Copper, Clean	100
Copper, Brazery	78
Gun Metal, Scrap	118
Lead, no Draft	26
Zinc, Old	40

*Official Prices.
†Includes Selection and Delivery.
‡Prices include Delivery in the U.K.

CONTROL OF STEEL SUPPLIES.

In accordance with the Ministry of Munitions Regulations, dated August 28th, which came into force on October 1st, all orders for Steel Supplies should. in addition to the Contract or Priority Number, bear the Prefix Letters shown below.

The marks given below are what will probably affect readers of THE AEROPLANE.

Admiralty (other than warships, vessels, warship repair contracts, and dockyards)	C.P.O.
Admiralty guns and airship sheds	C.P.G.
Aircraft Board	A.C.B.
Factory Construction (other than steelworks extensions)	M.F.C.
Machine Tools (a) other than cranes	M.T.D.
Machine Tools (b) Cranes	T.M.4.
Mechanical Transport (a) British	M.C.B.
Mechanical Warfare	M.W.A.

SOLID DRAWN STEEL TUBING.
AIR BOARD STANDARDS.
RANGE OF MAXIMUM PRICES.
FOR TUBING TO SPECIFICATION T.6 AND T.26.

O.D.	17G Price per foot. s. d.	20G Price per foot. s. d.	22G Price per foot. s. d.	.09" thick. Price per foot. s. d.	.12" thick. Price per foot. s. d.
¼ in.	5	5	5		
5/16 in.	5	5	5		
⅜ in.	5	5	5	8	
7/16 in.	5½	5¼	5¼		
½ in.	5½	5¼	5¼	8	1 0
⅝ in.	6	5½	5½	8½	1 0
¾ in.	6½	5½	5½	9	1 0
⅞ in.	7	5½	5½	9½	1 0
1 in.	7½	6	6	10	1 0
1⅛ in.	9	7	7	11½	1 1½
1¼ in.	10	8	8	1 0½	1 3
1⅜ in.	1 0	9	9	1 2½	1 5
1½ in.	1 2	11	11	1 3½	1 7
1⅝ in.	1 3½	1 1	1 1	1 5	1 9
1¾ in.	1 5	1 3	1 3	1 6	1 11
1⅞ in.	1 6½	1 5	1 5½	1 8	
2 in.	1 9	1 7	1 8	1 9	2 1
2⅛ in.	1 9½	1 8			
2¼ in.	1 11	2 0			
2⅜ in.	2 0½	2 3			
2½ in.	2 3	2 6			

The above prices are for random lengths.

EXTRAS.

If ordered to exact lengths, an extra of about 10 per cent. will be charged.

If Tubing is required to Specification T.1 or T.21, ½d. per ft. extra will be charged.

BALL-BEARINGS.

The Minister of Munitions, in exercise of the powers conferred upon him by the Defence of the Realm Regulations and all other powers thereunto enabling him, hereby orders as follows:—

1. No person shall on or after the date hereof (Nov. 1st) until further notice manufacture any ball bearing or roller bearing (both of which are hereinafter included in the expression "ball bearing") or any part thereof, except under and in accordance with the terms of a licence issued under the authority of the Minister of Munitions.

2. No person shall on or after the date hereof until further notice sell, supply, or deliver any ball bearing or any part thereof, whether situated in or outside the United Kingdom, or purchase or negotiate for the purchase or take delivery of any ball bearing or any part thereof, situated outside the United Kingdom except under and in accordance with the terms of a licence issued under the authority of the Minister of Munitions.

3. All persons engaged in the manufacture or sale of ball bearings shall make such returns with regard to their businesses as shall from time to time be required by or under the authority of the Ministry of Munitions.

All applications in reference to this Order should be addressed to the Director of Ball Bearings, T.M. 3, Ministry of Munitions, Whitehall Place, London, S.W.1, and marked "Ball Bearings."

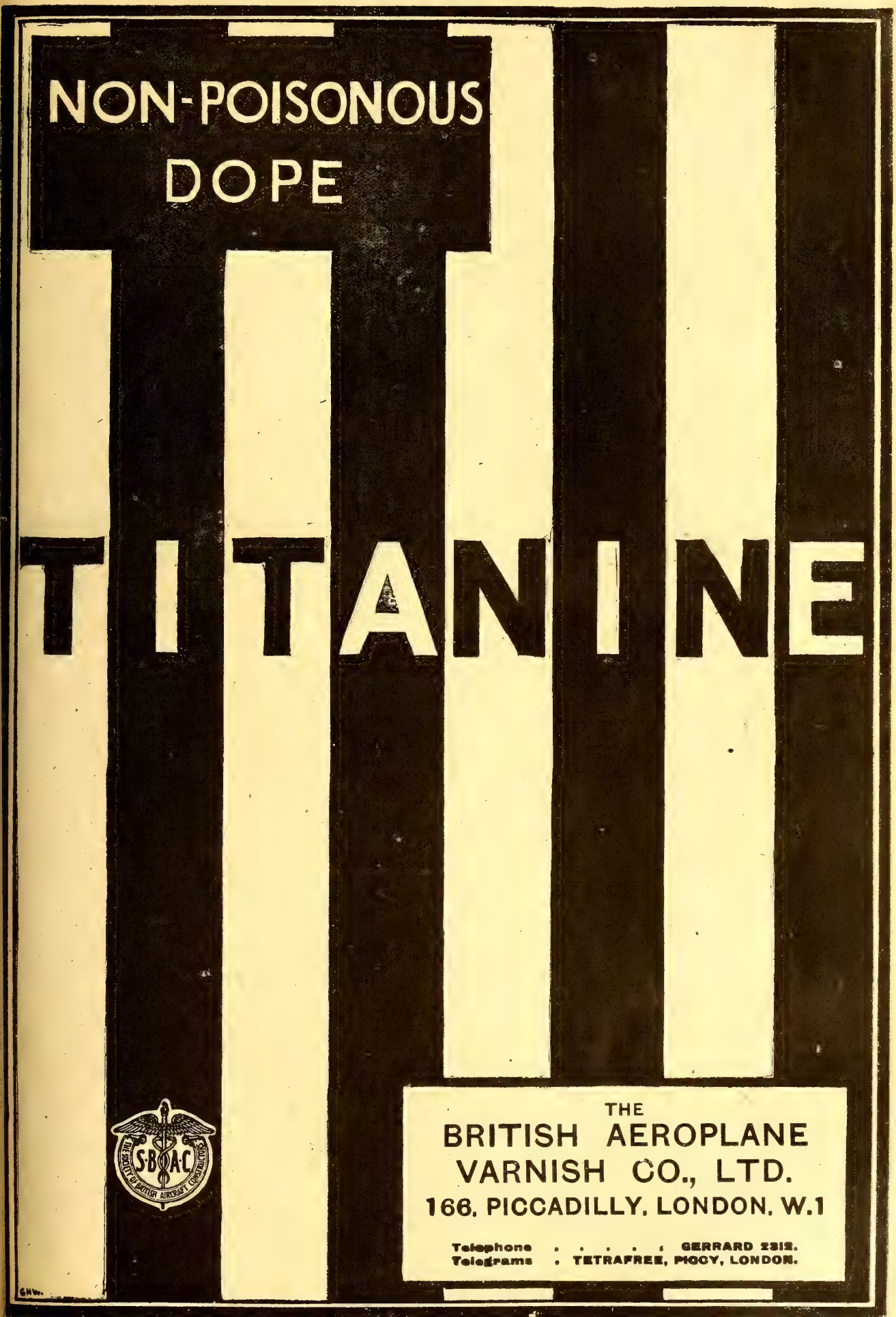
LEAVING CERTIFICATES.

Complaints having been made to the Minister of Munitions that employers in various areas are nullifying the freedom given through the abolition of the "leaving certificate" by refusing to engage men without the consent of the firms they previously served, Mr. Churchill has taken occasion to restate the general policy of the Government in regard to the munition workers' freedom of contract.

In a letter addressed to the heads of controlled establishments, he says that it is, and has always been announced as, the Government's intention that the repeal of Section 7 of the Munitions of War Act, 1915, should not result in the diversion of men from skilled work to less skilled occupations, or in the wastage of man-power by the engagement of labour in excess of immediate requirements.

Subject to these prevailing conditions, it has always been the intention of the Government that the freedom given by the abolition of the leaving certificate should be absolute; and, accordingly, it is inconsistent with the general policy of the Government that any employer should refuse to engage a workman on the ground that he had left his previous employment without his employer's consent.

Mr. Churchill also states that the operation of the Military Service Acts, 1916 and 1917, has not been altered or extended by any recent enactment, and that there is nothing to prevent an employer from engaging for munitions workmen who are entitled to protection from military service under the regulations in force, provided that the employer complies with the existing requirements as to notifying the recruiting authorities of their engagement.



KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

Firth's Aircraft Steels.

Mark "A" Non-Magnetic
Bullet-proof Plates
For Armouring Aircraft.

Thos. Firth & Sons Ld.,
Sheffield.

VICKERS LIMITED.

Contractors to the
WAR OFFICE AND ADMIRALTY.

**Aviation Department, Imperial Court,
Basil Street, Knightsbridge, S.W.3.**

Telephone No.—
KENSINGTON 6810 (2 lines).

Telegraphic Address—
VICKERFYTA, KNIGHTS, LONDON.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

AIRCRAFT FINANCE

CURRENT TOPICS.

Trading with the Enemy.
Emergency Legislation.
D.O.R.A.

In reply to a question asked in the House of Commons recently, Lord Robert Cecil stated that two Orders in Council had been made under the Extension of Powers Act, 1915, prohibiting British Trade with persons of enemy nationality and enemy association, and 39 Orders had been issued under the provisions of that Act. Nine Orders had been issued, placing 85 names on the Statutory list, but the latest Order removes from the Statutory list all persons or bodies of persons in the United States.

Even if the above represented a comprehensive statement of the complications arising out of these provisions, one ventures to think that merchants and others might sometimes be excused if, inadvertently, they were guilty of breaches of these regulations. Incidentally, it would seem as though the view entertained by the authorities in this country with regard to Germans resident in the United States is entirely different from that recently announced as being the policy of our latest ally.

Apparently so much emergency legislation, and so many Orders have been issued under the Defence of the Realm Act, that the authorities themselves cannot keep pace with their own decisions, and those whose duty it is to enforce them are hopelessly at sea. It is many months since a regulation was made prohibiting posters exceeding a specified size. Posters greatly in excess of this size are still to be seen upon our public hoardings, and not all of them were placed there before the Order was issued. A short time since, posters in excess of the prescribed size were issued by some pacifist body, and exhibited by sandwich-men just outside the House of Commons, and the Home Secretary expressed the view that "it would not be worth while" to endeavour to ascertain on whose authority these posters were issued.

Another example: With a view to saving paper, economising labour, and decreasing the amount of work thrown upon the Post Office authorities, it had been announced that traders' circulars and price lists were only to be forwarded to those who have applied for them in writing. Manufacturers will hardly require to be reminded that while this Order had undoubtedly to a very considerable extent reduced the waste of paper, printing and postage, it is still not infrequently ignored altogether. One finds that traders and others have now adopted the practice of sending printed letters out indiscriminately, inviting those who may be interested to apply to them for a full catalogue, with the result that probably the aggregate saving is not nearly so great as might be supposed, or as might reasonably have been anticipated.

One is led to suggest to the authorities that there is little to be gained by issuing Orders unless steps are taken to see that some attempt is made to carry them out, and to punish those who disregard them.

Excess Profits' Duty and War Loan Investments.

The Inland Revenue authorities are taking up the attitude that subscriptions to the War Loans are permanent investments and are, therefore, not "capital in the business" for Excess Profits' Duty purposes. At the time of flotation of the 5 per cent. War Loan, this matter was raised in the House of Commons, and a promise was given by the Government that business houses or companies who invested in the Loan would not be prejudiced. The present attitude of the Inland Revenue is, therefore, in direct contravention of this promise, a promise upon which, no doubt, many millions of business capital were invested.

If a manufacturer, instead of investing his spare capital in War Loan, had left the money lying on deposit with his bankers, there could then be no possibility of arguing that this was *not* capital in the business, and it appears to me grossly inequitable to penalise the patriotic taxpayer who invested in the War Loan.

The matter is of immense importance to every company with War Loan investments liable to pay Excess Profits' Duty, and it appears to me that unless concerted action be taken to keep the Government to its promise, future War Loans may suffer. The plain English of the matter is that, as a business proposition, a man would be unwise to invest his money in War Loans if the money is not treated for Excess Profits' Duty purposes as "capital in the business." The Treasury would be well advised to consider the point.

Copy America.

The report is just published that the directors of Swift and Company, the big Chicago packing house, have invested a large part of their available surplus in the "U.S. Liberty Loan," and it is rumoured that they propose to distribute their yearly dividend in Liberty Loan Bonds. This amounts to compulsory war investment for the stockholders, which in prevailing circumstances is to be highly commended, and such a course of action merits being adopted by every important company in this country.

[Quite so! But what about people who have to live on the dividends of their investments? They would have to sell these bonds in order to obtain ready cash, and if *all* dividends were paid in this way the sale of bonds would be so great that the bottom would fall out of the market.—Ed.]

Fully-paid Shares.

A correspondent writes me, under the nom-de-plume of "Service," on a question that I consider of vital importance and wide interest to every official connected with our Limited Companies.

"Service" inquires:—(A) "Whether he would be, or may hereafter become, in any way, financially liable for accepting shares in consideration for, and in settlement of a claim, for services he has rendered to the company, and (B) what are the necessary formalities demanded by law for the issue of shares for a consideration other than cash."

The Companies (Consolidated) Act, 1908, provides special clauses dealing with the issue and allotment of fully-paid shares covering these specific points.

> Section 88. (1) Whenever a Company limited by shares makes any allotment of its shares, the Company shall within one month thereafter file with the Registrar of Companies:—sub-section (b) "in the case of the shares allotted as fully or partly paid-up otherwise than in cash, a contract in writing constituting the title of the allottee to the allotment, together with any contract of sale, or for services or other consideration in respect of which that allotment was made, such contracts being duly stamped, and a return stating the number and nominal amount of shares so allotted, the extent to which they are to be treated as paid-up, and the consideration for which they have been allotted."

Therefore, in every case where an allotment is made for the issue of shares for a consideration other than cash, an agreement must be filed with the Registrar, which requires an *ad valorem* stamp duty amounting to one-half of 1 per cent. Consequently, before accepting such class of shares, it is necessary for the transferor to ascertain that the contract in respect of such shares has been duly filed with the Registrar.

If this is done, no liability attaches to the acceptance of such shares, but failure to do so involves the risk of incurring severe penalties, as will be seen by the following:—sub-section (3) of the Act, which provides:—

> If default is made in complying with the requirements of this section, every director, manager, secretary, or other officer of the company, who is knowingly a party to the default, shall be liable to a fine not exceeding fifty pounds for every day during which default continues.

Besides the risk of this penalty, the liquidator of a company is required carefully to examine the conditions of every allotment made by the Board of Directors, and any allotment of shares made as fully-paid, without the necessary contract being filed *prior* to such allotment, would above and above the penalty render the allottee liable to the liquidator to the extent of their nominal face value in case of a deficiency in the liquidation. Directors would, therefore, do well to make a careful note of the point.—G. A.

New Companies Registered.

The files of the following new companies registered with the nominal capitals of £5,000 and upwards are now available for inspection at Somerset House.

Blackburn Propeller Co., Ltd.—Registered November 2nd. £20,000 in £1 shares. Office: 86, Cross Street, Manchester.

Eldon Aviation Co., Ltd.—Registered November 6th. £5,250 in 5,000 preference shares of £1 each, and 5,000 ordinary shares of 1s. each. Office: 46, Eastcheap Buildings, E.C.3.

WESSEX AIRCRAFT AND SHIPBUILDING CO., LTD.—November 8th, 1917. £55,000 in £1 shares, of which 25,000 preferred.

COMPANY IN LIQUIDATION.

GENERAL AVIATION CONTRACTORS, LTD., 25 to 28, Crosby Buildings, Crosby Square, Bishopsgate, E.C.

(WINDING-UP ORDER.)

LIST OF CREDITORS.

General Aeronautical Co., Ltd., London	£238	0	0
Prentice W. Ridley, London	104	0	0
Rudell, F. A., London	118	0	0
Other Liabilities	848	0	0
Preferential Creditors	53	0	0
Liabilities	473	16	0
	£1,834	16	0
Assets	£1,750	0	9

ANSWERS TO CORRESPONDENTS.

A Financial Specialist will be pleased to answer in these columns inquiries on any subject affecting or relating to Investments, Stocks, Shares and Securities of Aircraft and kindred companies, free of charge.

"IN DOUBT" (Brighton).—You appear to have a legitimate grievance, but you have no redress if the company is an old one, and it is only since the passing of the Companies (Consolidation) Act, 1908, that holders of preference shares and debentures have the same right to receive and inspect the reports and balance-sheets of the company, as is possessed by the holders of the ordinary shares. This privilege extends only to companies registered subsequent to July 1st, 1908. Previous to this Act becoming law, holders of the preference shares and debentures could not demand inspection of reports and balance-sheets until the dividend or interest was in arrear or default made. That this was unreasonable is now recognised, but the Act is not retrospective. In the circumstances, we would suggest that you become an ordinary shareholder. The purchase by you of only one ordinary share would meet the difficulty.

"PRIVILEGE" (Luton).—If you are a member (that is, a shareholder), you are entitled to inspect the Register of Members, which the law compels every company to keep at the registered offices of the company, free of charge. The Act stipulates that it shall be open for inspection during business hours, and not less than two hours in each day be allowed for inspection.

"FOGGED" (Hove).—You say that you have sold fifty shares out of your holding of a hundred shares, for which you hold a certificate, and are puzzled as to how you should proceed to deliver the shares you have sold, and obtain a certificate for the reduced number of shares. You will require to sign a transfer for fifty shares, to which you will attach your certificate, and the secretary of the company will give a "transfer receipt" for the fifty shares sold, and a "balance ticket" for the fifty shares retained. Both the "transfer receipt" and the "balance ticket," will, in due course, be exchanged for the company's certificates. As regards the cost, the secretary is entitled to charge 2s. 6d. for registration of the transfer.

"ALBION."—The company to which you refer is registered as a "Private" company, and, consequently, is not required to publish any balance-sheets, but as a shareholder you are entitled to receive a copy of the annual accounts. There are no public dealings in the shares.—G. A.

THE BRIGHTON-SHOREHAM AERODROME.

Compensation payable by the Government to the Brighton Shoreham Aerodrome, Ltd., has been assessed by an umpire at £25,765, as against a total claim of £191,000.

[Well! The more you ask the more you get. Probably, if the Brighton-Shoreham people had asked for £25,000 they would have got £5,000. At any rate, the sum awarded seems to cover all expenditure, and leave a moderate interest on the money, so if the company has been robbed by the Government it has only been robbed of profits dimly in prospect.—ED.]

A QUESTION OF PRIORITY.

A minor crisis has arisen over the question of commandeering premises. The Air Board, lodged in the Hotel Cecil, wants to expand, and has sought to lay a hand on the offices of the Metropolitan Water Board, close by in buildings near the Savoy Hotel.

The Metropolitan Water Board objects, stating that the supervision of London's water supply is a most important public need, and the dispute has been referred to the Government for settlement.

[One understands that the dispute was finally settled in favour of the Air Board. So now when you find soda-water coming out of the bath-tap you will know what is the matter.—Ed.].

STRIKERS AS MURDERERS.

How a delay in the delivery of an aeroplane—a delay caused by a strike—resulted in the sacrifice of 500 British lives in France is described by Boyd Cable in a remarkable battle story in the "Penny Pictorial."

The editor says:—"In publishing it I have only one desire—that it shall catch the eye and reach the heart of every person on war work of any kind. What applies to the lack of aeroplanes applies also to the lack of shells or other munitions of war. A shortage in any one of them may cost the lives of thousands of our own brothers who are daily facing the horrors of battle."

[Thus one sees that strikers may become as dangerous to their fellow-countrymen on active service as are politicians—in uniform and out—who hang up deliveries of aeroplanes to suit their own ends.—Ed.]

HOW NOT TO DO IT.

At Marylebone Police Court on Nov. 6th William Theodore Nicholls, proprietor of the West End Automobile Company, Jermyn Street, Regent Street, was summoned on a charge of making a corrupt gift of £5 to Ernest George Webber, a second lieutenant in the Royal Flying Corps, attached to the Stores Department of the War Office at Regent's Park, as an inducement for showing favour to him in relation to the affairs of the Secretary of State for War.

Since July last year the defendant had supplied engine parts and had done repairs for the depôt of the Royal Flying Corps at Regent's Park. In the early part of September complaint was made that there had been overcharging in connection with work done by the defendant, and on the 12th of that month Mr. Webber saw him about the matter at the office of Lt. Gorringe at Regent's Park. The defendant promised to look into it. He said he had taken larger premises, and expressed the hope that he would have further and bigger orders.

On Mr. Webber leaving the office he was followed by the defendant, who asked him to have a cigarette, and pressed on him a little box, saying: "There are only two in it; put it in your pocket." Mr. Webber did not look into the box until he was in the train on his way home, when, to his astonishment, he discovered that it contained four £1 and two 10s. notes.

Thinking that the defendant must have made a mistake, he telephoned to him the following day and asked if he was short of money. "No," was the reply. Mr. Webber then asked if the knew what was in the box. "Of course I do," replied the defendant. "It is for a big fat cigar." Next morning the officer reported the matter.

Mr. Pearce, who prosecuted, said that this was an insidious attempt to corrupt a young officer in a position of some responsibility, and was also an insult to his Majesty's uniform.

Mr. R. D. Muir urged in mitigation that the defendant, who was in bad health, had not received, nor did he expect to receive, any favour from the officer.

Mr. Biron said he took a very serious view of the case. This was an attempt to bribe a responsible officer in order that he might neglect his duty and betray his trust, and, having regard to the gravity of the offence, the defendant would have to go to prison for three months in the second division.

CURRENT SHARE QUOTATIONS.

The following are the share quotations made up to Tuesday morning in each week of the principal companies engaged in the Aircraft Industry and Kindred Trades.

Aircraft Mnfg. Co.	7% cum. pref. £1	21/-	25/-
Armstrong (Sir W. G.) Whitworth & Co., Ltd.	4% cum. pref. £5	3¼	3⅜
	5% 2nd. pref. £1	17/-	19/
	£1 ordinary	39/6	40 6
Austin Motor Co., Ltd.	7% cum. pref. £1	18/-	19/-
	£1 ordinary	26/6	27 6
Birmingham Small Arms Co., Ltd.	£1 ordinary	54/-	55/- x
	5% cum. "A" pref.	4⅛	4⅜
	6% cum "B" pref.	2 /-	22/- x
Boulton & Paul, Ltd.	5% cum pref. £1	¾	⅞
Brown Bros., Ltd.	6% cum. pref. £5	4½	4⅝
Darracq (A) & Co., (1905) Ltd.	£1 ordinary	37/-	38 -
	7% cum pref. £1	23/-	24/-
Electric Construction Co., Ltd.	7% cum. pref. £1	19/3	19 6
	£1 ordinary	1	1-1/16
Fellows Magneto Co.	8% cum. partip pref.	17/-	18
General Electric Co., Ltd.	6% cum. pref. £10	10-5/16	10-7/16
	£10 ordinary	18	19
Gwynnes, Ltd.	5% cum. pref.	91/-	92/-
	Ordinary	8/3	8/6
Greenwood & Batley, Ltd.	£10 ordinary	9	10
Humber, Ltd.	6% cum. pref. £1	17/-	18 -
	£1 ordinary	17/-	18/-
Napier (D) & Son, Ltd.	7½% cum. pf. £1	18/-	18/6
Peter Hooker, Ltd.	£1 7% cum. partic. 1st pref.	20 -	21 -
Rolls Royce, Ltd.	£1 ordinary	60/-	61/-
Rudge Whitworth, Ltd.	£1 ordinary	42/-	43/-x
Ruston, Proctor & Co., Ltd.	£1 ordinary	26/-	27 -
	5% cum. pref. £1	17/-	17/6
Sunbeam Motor Car Co., Ltd.	£1 ord	88/-	89/-
Straker Squire, Ltd. (1913)	£1 ordinary	22/-	23/-
S. Smith & Son, Ltd. (Motor Accessories)	£1 ordinary	26/-	27/-
Triplex Safety Glass, £1 ordinary		21/-	22/
Vickers, Ltd.	5% pref. stock	78	82
	5% pref. shares. £1	17/-	18/-
	£1 ordina y	39/-	40 -
Wm. Beardmore & Co., Ltd.	6% c. pf. £1	19/-	19/6

GENERAL INFORMATION.

Armstrong, Whitworth (1916).
Austin Motor (1916).
B'ham. Small Arms (1915-16).
Rolls Royce.
Rudge Whitworth.
Straker-Squire (1915).
Sunbeam Motor.
Thorneycroft (J. I.) & Co.
Vickers (1915 and 1916).

Owing to the difficulty of estimating liabilities under Finance and Munitions Acts, the accounts will not be ready until a later date.

x—ex dividend

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(*Continued from page* 1410.)

PERSONAL NOTICES.

Death.

KERR.—An inquest was held at Minster, Thanet, on Nov. 12th, on the body of Flight Sub-Lieut. David Ross Kerr, R.N., aged 20, who was killed on Nov. 11th while flying. The evidence showed that when at a height of 3,000 ft. his machine began to spin. Mr. Ross recovered control about 1,500 ft. from the ground, but another spin began immediately afterwards, and the machine fell. It was stated the aeroplane was in good order. The jury returned a verdict of "Death from misadventure."

TOWERS.—Flt. Sub-Lt. Grantham Towers, R.N., who died on Nov. 7th at Haslar Hospital, Portsmouth, as the result of a flying accident, was the only son of the late Robert Mason Towers, Bengal Civil Service, and Mrs. Towers, of The Old Vicarage, Stapleford, Cambridge.

Engagement.

BUTCHER—HODGSON.—A marriage has been arranged between Flt. Comdr. O. A. Butcher, D.S.C., R.N., and Beatrice Viola Hodgson, younger daughter of the late Edmund Dorman Hodgson, of the Middle Temple, barrister-at-law, and Mrs. Dorman Hodgson, of 12, Montpelier Place, Brighton, and The Sycamores, Newick, Sussex.

Births.

DAWSON.—On Nov. 6th, at 14, Highland Road, Upper Norwood, the wife of Lieut. Grahame G. Dawson, R.N.A.S.—a son.

HARDSTAFF.—On Nov. 4th, at 3, Sussex Mansions, Westgate-on-Sea, the wife of Flt. Comdr. R. C. Hardstaff, R.N.A.S., of a son.

MILITARY.

G.H.Q. Communiqués.

Nov. 6th, 9.30 p.m.—Attack on Passchendaele.

During the day the weather has been unsettled, and rain has fallen at intervals. Improved visibility, however, has assisted the work of our artillery and aircraft, and, combined with the valuable observation gained by our advance, has enabled our guns to deal effectively with the enemy's batteries and with concentrations of hostile infantry.

On the 5th instant there was a slight improvement in the weather, but mist still prevented our aeroplanes from carrying out artillery and photographic work.

Only a few combats took place, in the course of which two enemy machines were brought down. In addition, a low-flying hostile machine was shot down in our lines by our infantry.

One of our machines is missing.

Nov. 7th, 10.12 p.m.—During the morning of the 6th inst. high wind and rain greatly interfered with work in the air. Nevertheless, our low-flying aeroplanes maintained constant touch with our advancing infantry, and, in addition, fired a large number of rounds from their machine-guns at the enemy shell-holes as well as in back areas.

Many fleeing targets were signalled to our artillery from the air, and were successfully dealt with by our batteries.

During a fair interval many of our aeroplanes, acting in conjunction with our operations on the ground, penetrated well east of the line.

Whilst so employed they were caught in a heavy mist, which suddenly developed, and seven machines failed to return.

During the night 62 heavy bombs were dropped on the enemy's railways, communications, billets, and aerodromes in the vicinity of Roulers and Courtrai. Several large explosions, which were followed by fires, were observed in Roulers station and town.

In air fighting one German machine was brought down, and two others were driven down out of control.

Four of our aeroplanes are missing in addition to those mentioned above.

Nov. 8th, 9.8 p.m.—During the morning of the 7th instant low clouds and rain considerably hampered aerial work. In the afternoon, however, weather conditions improved, and some successful artillery and photographic work was carried out by our aeroplanes.

Our low-flying machines fired many rounds at hostile troops and transport, and a number of bombs were dropped in the course of the day on the enemy's trenches and billets.

During the night over three tons of bombs were dropped on the enemy's aerodromes at Gontrode and St. Denis Westrem, and on aerodromes in the valleys of the River Lys. Railway communications were also bombed, and satisfactory results were observed.

Few hostile aeroplanes were encountered, but one was driven down out of control, and an enemy observation balloon on the ground was destroyed by one of our low-flying machines.

One of our aeroplanes failed to return.

Nov. 9th, 9.12 p.m.—On the 8th instant the weather conditions during the early morning were good for flying. Later in the day, however, aerial work was carried out under considerable difficulties owing to a strong westerly wind, with heavy clouds and occasional rain.

A large amount of work was accomplished by our aeroplanes in conjunction with our artillery, and a number of photographs were taken.

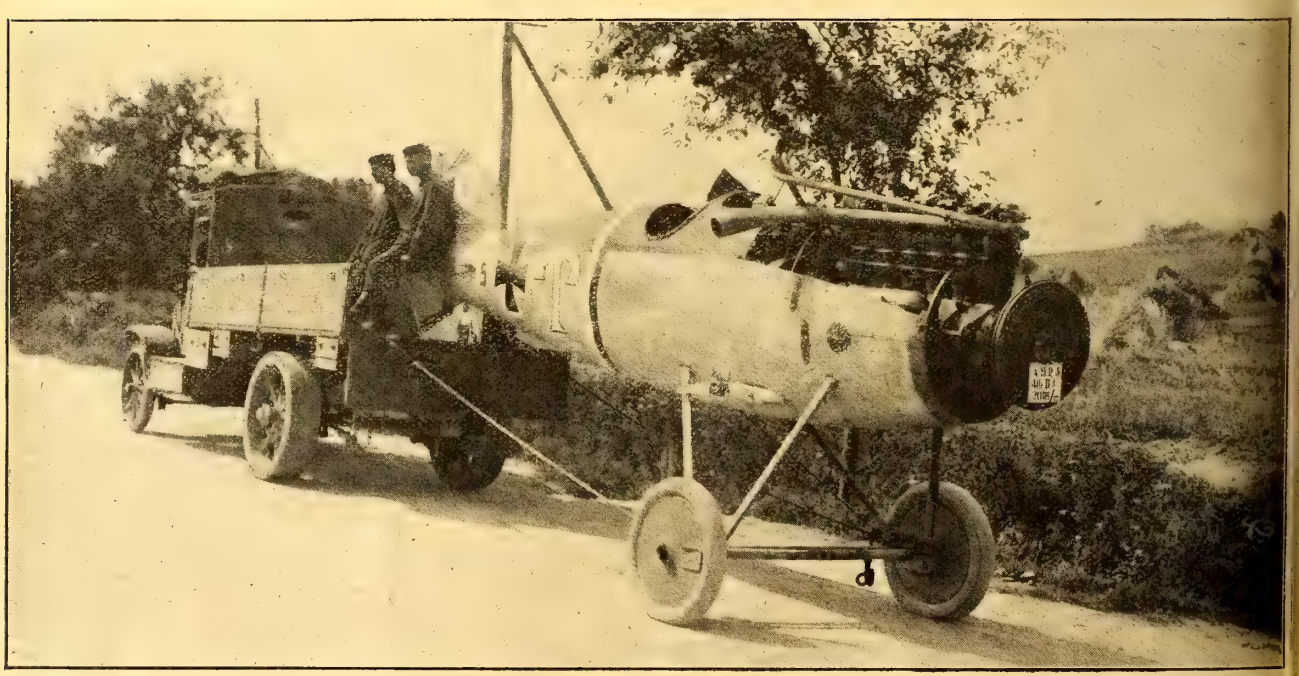
Our low-flying machines co-operated in raids carried out by our troops on the German trenches, and fired many rounds at hostile infantry and machine-guns.

Numerous bombs were dropped during the day on the enemy's trenches and billets with good results, but unfavourable weather prevented bombing by night.

A very large number of fights took place in the air. Twelve hostile machines were brought down and six were driven down out of control. Two other hostile machines were shot down by anti-aircraft guns.

Ten of our machines are missing, including one which failed to return from a bombing raid on the night of the 7th-8th instant.

Nov. 10th, 10.7 p.m.—More favourable weather conditions prevailed on the 9th instant, and a large amount of work was carried out in the air.



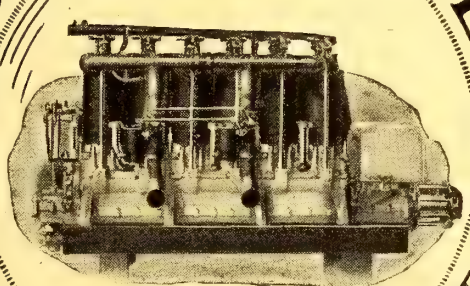
A NEW SCOUT.—The fuselage of a German single-seater Albatros of new type, known as the D.v. It is of the "one-and-a-half" plane type, with an eight-cylinder Mercédès engine.



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C.O.C.

Many targets were successfully engaged by our artillery with aerial observation, and many photographs were taken. The enemy's infantry and transport were engaged by our low-flying aeroplanes on several occasions and were seen to suffer casualties.

During the past 24 hours three tons of bombs have been dropped on hostile billets and aerodromes, good results being observed.

In air fighting one hostile machine was brought down and five others driven down out of control.

Two of our aeroplanes are missing.

Nov. 11th, 9.10 p.m.—On the 10th inst. rain fell nearly all day, and made work in the air almost impossible.

Many attempts were made by our aeroplanes to gain touch with out attacking infantry, and a small amount of artillery work was accomplished. Rain continued to fall throughout the night, and, in consequence, bombing operations had to be suspended.

Such machines as attempted to work over the enemy's lines returned safely to their aerodromes.

Nov. 12th, 9.14 p.m.—In spite of stormy weather, a considerable amount of aerial work was carried out by our aeroplanes on the 11th instant in conjunction with our artillery.

A few bombs were dropped during the day on hostile billets and trenches, but bad weather conditions made observation of results difficult. A large number of rounds were fired from machine-guns at ground targets by our low-flying aeroplanes, and in one case a hostile battery was silenced.

Air fighting was carried out under considerable difficulties owing to low clouds. One hostile machine was destroyed, and four others were driven down out of control.

None of our machines are missing.

War Office Communiqué.

Nov. 8th.—The G.O.C. the British in Palestine reports :—

Our aeroplanes inflicted losses on troops retiring, and on concentrations at railheads.

Nov. 9th.—The G.O.C. the British Forces in Palestine reports :—

Our aeroplanes are bombing the retreating Turks.

Nov. 10th.—The G.O.C. the British Forces in Palestine reports :—

Our aeroplanes continue to bomb retreating bodies of the enemy and important centres on his communications with considerable effect; in this way nearly 300 bombs were dropped during the day (Nov. 9th).

Nov. 11th.—The G.O.C. the British Forces in Palestine reports :—

The R.F.C. on the same day bombed the junction station of Wadi Surar (where the railway along the coast towards Gaza branches from the Joppa-Jerusalem line). There was a large quantity of rolling stock in the station, on which, and on the station building, several direct hits were observed to cause considerable damage

The Casualty List.

Reported Nov. 7th.

Accidentally Killed.—Heffernan, Sec. Lt. W., R.F.C., attd. H.A.C.

Wounded.—Clarke, Lt. E. D., R.F.C.
Fenton, Lt. J. B., Mx. R., attd. R.F.C.
Hewat, Sec. Lt. R. A., R.F.C.
Malik, Sec. Lt. H. S., R.F.C.
Ryan, Lt. W. G., R.F.C.
Scott, Sec. Lt. H. S., W. Yorks. R., attd. R.F.C.

Missing.—Archibald, Sec. Lt. L. M., R.F.C.
Fleming, Sec. Lt. J. A. M., R.F.C.
Greenslade, Lt. R. S., R.F.C.
Jones, Sec. Lt. W. H., R.F.C.
Ringer, Sec. Lt. E. C. S., R. Suss. R., attd. R.F.C.
Smith, Sec. Lt. E., A. L. F., R.F.C.

Correction.—Previously reported Missing, now reported Killed.—Hayes, Sec. Lt. R., R.F.C., should read Lt.

Canadian Contingent.—Died of Wounds.—Rogers, Capt. G. C., M.C., B.C.R., attd. R.F.C.

Reported Nov. 8th.

Died of Wounds.—Sanders, Sec. Lt. J. H., R.F.C.

Wounded.—Cook, Capt. A. B., R.F.C.
George, Sec. Lt. O. C., R.F.C.
Jones, Capt. C. N., Sher. For., attd. R.F.C.

Missing.—Barton, Sec. Lt. C. H., R.F.C.
Bradley, Sec. Lt. G. R., R.F.C.
Cartledge, Sec. Lt. R. A., R.F.C.
Goode, Lt. R. J. E. P., R. Dub. Fus., attd. R.F.C.
Marvin, Sec. Lt. H. L., R.F.C.
Phillips, Sec. Lt. C. I., Glouc. R., attd. R.F.C.
Primeau, Sec. Lt. C. W., R.F.C.
Rhys-Davids, Sec. Lt. A. P. F., D.S.O., M.C., R.F.C.
Sherwood, Lt. W. B., R.F.C.
Whitehouse, Sec. Lt. S. L., R.F.C.

Reported Nov. 9th.

Killed.—Harriman, Sec. Lt. C. H., R.F.C.
Muller, Lt. J. H., Middx. R., attd. R.F.C.
Pearson, Sec. Lt. L. G., R.F.C.

Died of Wounds.—Ironside, Sec. Lt. J. P., R.F.C.

Wounded.—M'Alery, Capt. J. M., R.F.C.
Shaw, Sec. Lt. C. L., R. Berks R., attd. R.F.C.

Missing.—Clark, Sec. Lt. F. S., R.F.C.
MacLaughlin, Sec. Lt. A. W., R.F.C.
Moore, Sec. Lt. C. A., R.F.C.
Thornton, Sec. Lt. H. J., R.F.C.

Reported Nov. 9th.

Killed.—Counter, Capt. J. C. A., Welsh Regt., attd. R.F.C.
Keir, Sec. Lt. E. H., R.F.C.
Leeson, Lt. A. N., D.S.O., R.H.A., attd. R.F.C.
Wasey, Capt. C. W. C., R. War. R., attd. R.F.C.

Previously reported Missing, believed Killed, now reported Killed.—Matthews, Sec. Lt. H., R.F.C.

Previously reported Missing, now reported Killed.—Brasington, Sec. Lt. F. T., R.F.C.
D'Arcy, Sec. Lt. L. G., Conn. Rang., attd. R.F.C.
Fitzherbert, Capt. W. W., R. Suss. R., attd. R.F.C.
Gagne, Sec. Lt. J., R.F.C.
MacMurchy, Sec. Lt. I. U., R.F.C.
Smither, Sec. Lt. H., R.F.C.

Wounded.—Baker, Sec. Lt. G. F., R.F.C.
Bond, Sec. Lt. F. E., R.F.C.
Booth, Lt. G. B., M'x R., attd. R.F.C.
Duff, Capt. I. A. J., Dorset R., attd. R.F.C.
Rhodes, Lt. E., R.F.C.
Temperley, Capt. C. J., N. Cyc. Bn., attd. R.F.C.

Previously reported Wounded and Prisoner, now reported Died of Wounds as Prisoner in German Hands.—Hutchinson, Lt. C. D., S. Staff. R., attd. R.F.C.

Previously reported Missing, now reported Died of Wounds as Prisoner in German Hands.—Chambers, Capt. P. W., R.F.C.

Previously reported Prisoner, now reported Died of Wounds as Prisoner in German Hands.—Stevens, Lt. E. H., E. Lan. R., attd. R.F.C.

Previously reported Missing, now reported Prisoners in German Hands.—Andrews, Sec. Lt. F. C., R.F.C.
Bushe, Sec. Lt. J. F., R.F.C.
Crane, Sec. Lt. C. G., R.F.C.
Hammond, Sec. Lt. H. T., R.F.C.
Loyd, Sec. Lt. E. E. F., Drag. Gds., attd. R.F.C.
Orr-Ewing, Sec. Lt. A. J., Yeo., attd. R.F.C.
Shadwell, Sec. Lt. L. M., R.F.C.
Watt, Sec. Lt. W. H., Ches. R., attd. R.F.C.

Indian Force.—Missing.—Dalley, Sec. Lt. J. P., I.A.R.O. attd. R.F.C.

Reported Nov. 12th.

Killed.—Gallinger, Sec. Lt. G. H., R.F.C.
Johnston, Sec. Lt. A., R.F.A., attd. R.F.C.
McJanet, Sec. Lt. A. W., R.F.C.
Wakeman, Lt. F. T., R. War. R., attd. R.F.C.

Died of Wounds.—Whitfield, Sec. Lt. L. H., R.F.C.

Accidentally Killed.—Morse, Sec. Lt. G. E., R. Welsh Fus. attd. R.F.C.

Wounded.—Alexander, Sec. Lt. L. C. R., R.F.C.
Heys, Lt. G. D. A., R.G.A., attd. R.F.C.
Judge, Lt. H. E., R.F.C.

Missing.—New, Lt. H. B., Ess. R., attd. R.F.C.
Scott, Sec. Lt. E. D., R.F.C.

Reported Nov. 13th.

Wounded.—Anderson, Sec. Lt. S. St. K., R.F.C.
Barker, Lt. J., R.F.C.

Missing.—Davidson, Sec. Lt. W., R.F.C.
Dodd, Sec. Lt. W. De C., R. Muns. Fus., attd. R.F.C.
Gray, Sec. Lt. G. R., R.F.C.
Kemp, Sec. Lt. N. H., R.F.C.
Montague, Sec. Lt. P. D., Rif. Brig., attd. R.F.C.
Parker, Lt. W. L. O., Hrs., attd. R.F.C.
Powell, Sec. Lt. E. W., R.F.C.
Randall, Sec. Lt. S. W., R.F.C.
Smith, Sec. Lt. R. M., R.F.C.

Previously reported Missing, now reported Prisoner in German Hands.—Boumphrey, Lt. J. W., Yeo., attd. R.F.C.

* * *

Casualties among N.C.O.'s and Men.

The dates are those of the official list.

Killed.

Oct. 29th.—R.F.C.—Hoadley 44580 2nd Cl. Air Mech. C. J. (Partridge Green).

Oct. 31st.—R.F.C., attd. R.G.A.—Rigby 8699 1st Cl. Air Mech. F (Newry, Co. Down).

Previously reported Accidentally Killed, now reported Killed.

Oct 30th.—R.F.C.—Muscutt 88146 2nd Cl. Air Mech. J. H. (Hanley).

Previously Missing, now reported Killed.

Nov. 2nd.—R.F.C.—Barnes 61925 Sjt. W. A. (Parkhurst); Ekins 46133 2nd Cl. Air Mech. A. W. (St. Neots); Trusso 40181 2nd Cl. Air Mech. (Cudham).

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TELEGRAMS: "GWYNNE, LONDON."

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

Nov. 3rd.—Bond 19789 1st Cl. Air Mech. W. (March); Bonner 1897 1st Cl. Air Mech. P. (Guildford).

Died of Wounds.

Oct. 29th.—R.F.C.—Browne 53662 2nd Cl. Air Mech. C. (Nailsworth); Tredale 30052 1st Cl. Air Mech. F. (Hollinwood); Mullins 6838 1st Cl. Air Mech. T. B. (Finsbury, E.C.).

Oct. 30th.—Hall 29292 1st Cl. Air Mech. A. W. (Kettering); Payne 29174 2nd Cl. Air Mech. B. W (New Brighton); Tracey 27094 1st Cl. Air Mech. W. H (Highbury, N.); Wingfield 11706 1st Cl. Air Mech. C. W. (Kensington, W.).

Nov. 1st.—Fowler 92566 2nd Cl. Air Mech. E. T. (Battersea, S.W.).

Nov. 3rd.—Hayes 45057 2nd Cl. Air Mech. W. (Cricklewood, N.W.).

Wounded.

Oct. 29th.—R.F.C.—Barham 48793 2nd Cl. Air Mech. A. (Maidstone); Finney 43970 2nd Cl. Air Mech. W. L. (Vauxhall, S.W.); Street 43972 2nd Cl. Air Mech. W. V. D. (Eastbourne).

Nov. 1st.—Botwright 44697 2nd Cl. Air Mech. J. J. D. (London, S.W.); Bruce 7526 1st Cl. Air Mech J. W. (Tooting, S.W.); Corwell 8898 1st Cl. Air Mech. R. C. (St. Ives); Furnival 56626 2nd Cl. Air Mech. C. P. (Peckham, S.E.); Hildreth 8855 1st Cl. Air Mech. H. W. (Chester); Read 49950 2nd Cl. Air Mech. J. H. (Failsworth); Silcox 68109 2nd Cl. Air Mech. S. D. (Bath); Slade 7986 1st Cl. Air Mech. M. W. (Highampton); Steward 66942 2nd Cl. Air Mech. C. O. M. (Kensington, W.).

Nov. 3rd.—Baines 10819 1st Cl. Air Mech. L. (Boston); Burry 75047 3rd Cl. Air Mech. H. (Earlsfield, S.W.); Crosby 11267 1st Cl. Air Mech. W. (Bethnal Green, E.); Love 76929 3rd Cl. Air Mech. J. (Nottingham); McGrath 8238 1st Cl. Air Mech. J. M. (Bromley); Markwell 37174 2nd Cl. Air Mech. G. W. (Bow, E.); Mollett 9154 1st Cl. Air Mech. F. (Bermondsey, S.E.); Parry 19776 1st Cl. Air Mech. S. (Birmingham); Walker 43952 2nd Cl. Air Mech. S. D. (Brixton, S.W.); Whiteside 20685 Cpl. T. (Kirkham).

R.F.C., attd. R.F.A.—Luffman 9874 2nd Cl. Air Mech. S. J. (Reading).

R.F.C., attd. R.G.A.—Fuller 8799 2nd Cl. Air Mech. H. A. (Catford, S.E.).

Missing, believed Killed.

Nov. 1st.—R.F.C.—Blatherwick 93629 2nd Cl Air Mech. C. A. (Hardwick).

Previously reported Missing, now reported Missing, believed Killed.

Oct. 30th.—R.F.C.—Lambeth 88285 Sjt. G. E. (Snodland).

Nov. 1st—Comerford 1166 Sjt. C. J. (Gillingham); Edginton 1384 Sjt. S. F. (Woodley, Reading).

Missing.

Oct. 29th.—R.F.C.—Bright 89279 2nd Cl. Air Mech. H. H. (Newbury).

Nov. 2nd.—Stanley 6717 Sjt. A. O. (Bow. E.).

Nov. 3rd.—R.F.C.—Wardlaw 78979 1st Cl. Air Mech. A. H. (Chesterfield).

Previously Missing, now reported by the German Government Killed or Died of Wounds.

Oct. 30th.—R.F.C.—King 61783 2nd Cl. Air Mech. F. (Spalding).

Previously Missing, now reported Died as Prisoner of War in German Hands.

Oct. 30th.—R.F.C.—Aldred 77449 Sjt. B. (Long Eaton).

Australian Imperial Force.

No ranks are shown for the Australian Imperial Force.

Died.

Nov. 3rd.—A.F.C.—Hereford 1397 W. H.

PERSONAL NOTICES.

Deaths.

ASHER.—Second Lieut. Ronald Stuart Asher, R.F.C., who was reported missing on Sept. 21st, and is now reported killed in action, was the only son of Mr. and Mrs. A. G. G. Asher, 2, Belford Park, Edinburgh. Educated at Horris Hill and Winchester he was gazetted in August, 1916, and had been at the front about seven months. He was nineteen years of age.

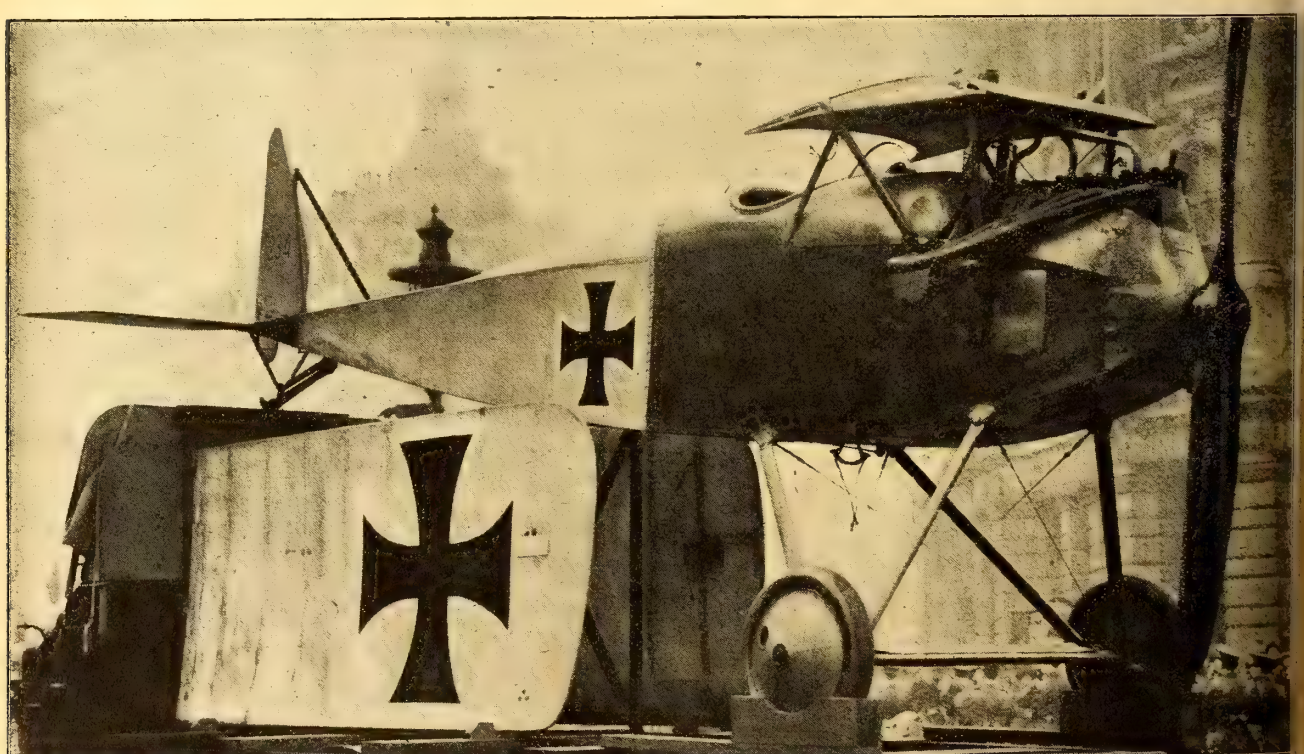
BISPHAM.—At Hendon, on Nov. 6th, an inquest was held on the body of Second Lieut. David Charles Bispham, R.F.C., whose death was announced last week. Mr. George Beatty said that Mr. Bispham was making his second solo flight, and was descending after having been up 1,500 to 2,000 feet, when he got into a heavy mist. The machine came to the ground, but was not badly damaged, and the deceased's body was picked up about 40 feet away, a witness expressing the opinion that he must have been pitched out of the machine. A verdict of "accidental death" was returned. It was stated that Mr. Bispham's relatives live in the United States.

BRIGHT.—Sec. Lieut. H. H. Bright, R.F.C., who was killed in aerial action was the son of Mrs. Bright, Berks. He was 19 years of age and had served two years.

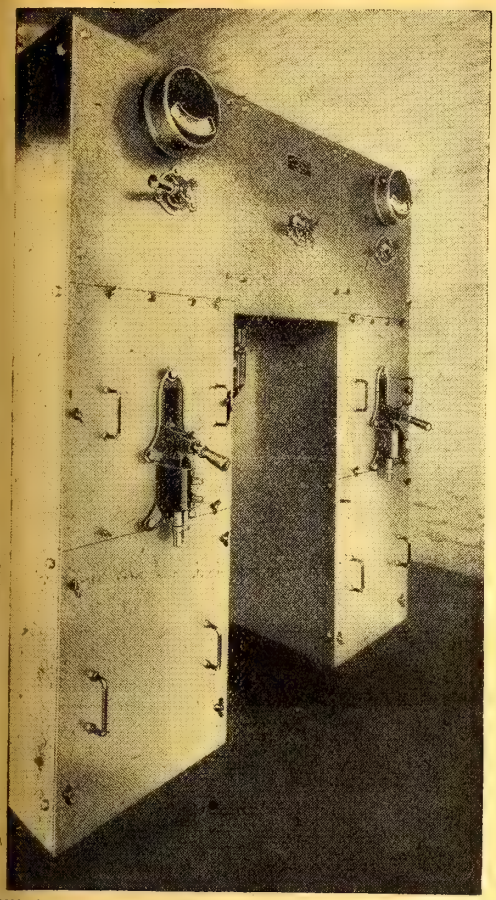
CARTER.—Sec. Lieut. Bernard Robert Hadow Carter, R.F.C., who was killed on Nov. 7th while on special duty, was the third son of Rev. J. O. H. and Mrs. Carter, Slymbridge Rectory, Glos.

CARTER.—A fatal flying accident occurred at a North Wales aerodrome on Nov. 7th. Preparing to descend, Lieut. R. H. Carter, R.F.C., stopped his engine and was circling over the aerodrome when a gust of wind upset the machine, which fell and was wrecked. Mr. Carter was thrown against a wall and killed, but Corporal Harold Smith, who was with him, escaped with a severe cut.

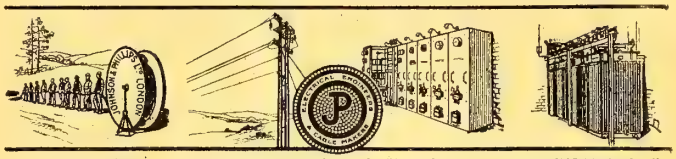
COSGROVE.—Sec. Lieut. Gordon Sallnow Cosgrove, R.F.C., whose death occurred as the result of an accident announced last week, was the fourth son of Mr. W. O. and Mrs E. R. Cosgrove. He was educated at Merchant Taylors' School and was Scholar-elect of St. John's College, Cambridge.



VÆ VICTIS! A captured Halberstadt fighting biplane, which figured in the Lord Mayor's procession. The machine is rather roughly built, but has good lines.



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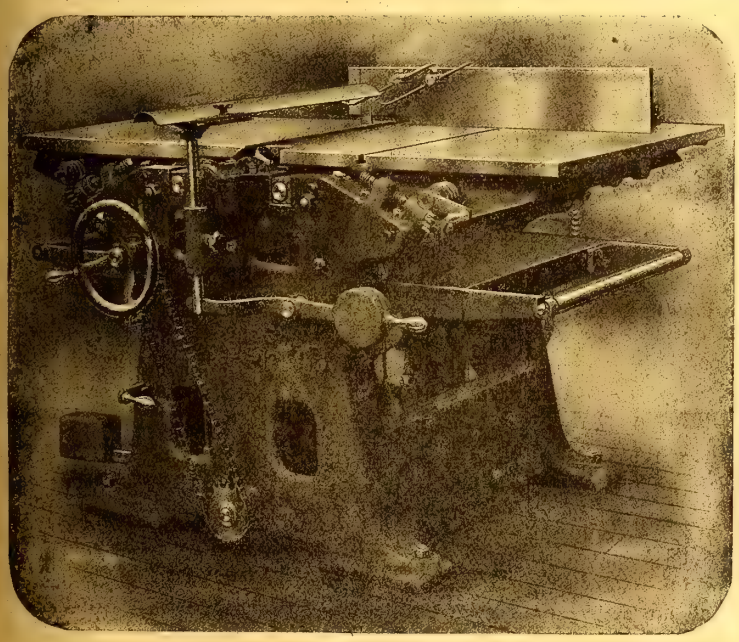
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JACKSON.—At a south coast town, on Nov. 6th, an inquest was held on the body of Lieut. Charles Jackson, R.F.C., aged 22, of Sheffield, who was found in the Channel with the wreckage of his aeroplane. Mr. Jackson, with another officer as pilot, went out for a practice flight on Nov. 5th. A verdict of "Found dead in the sea, death being due to injuries and drowning" was returned. Mr. Jackson had served in France with the York and Lancaster Regt.

JOHNSTON.—Lt. Andrew Johnston,, R.F.C., was the son of Capt. Fowell Buxton Johnston (formerly 3rd Dragoon Guards), by his second wife, a sister of Sir R. Chalmers. He was nephew of Mr. Andrew Johnston, the first chairman of the Essex County Council. Born in 1897, he was educated at Bedales School, Petersfield, entered Woolwich in December, 1914, received a commission in the R.F.A. in October, 1915, sailed for Egypt in December, and six months later was sent to Salonika. In July, 1916, he was invalided home, but returned to his battery at the front at Christmas, and last July came home to train for flying On Sept. 16th he returned to the front, where he took part in several fights in the air, in one of which, with three other machines, he encountered 15 Germans. On his last flight he had been up, as an observer, for three hours, and when preparing to alight seems to have been caught in an eddy. The machine plunged, and Mr. Johnston was killed instantly.

KEEBLE.—Sec. Lt. John Harold Keeble, R.F.C., the second son of Mr. and Mrs. John R. Keeble, of Brantham Hall, Suffolk, was killed while flying in Kent on Saturday, Oct. 27th. He was educated at Colchester Grammar School and Dunheved College, Launceston. He was a keen sportsman and athlete being captain of the Dunheved College football team, and also of the R.F.C. Cadet team at Denham. He joined up on March 8th last, and obtained his commission in the R.F.C. on July 21st.

LEVENTON.—Sec. Lt. Raymond Sylvester Leventon, R.F.C., was the elder son of Mr. and Mrs. Herbert Leventon, of Huyton, near Liverpool, and was born in 1898, and educated at Greenbank School, Liverpool, and Mostyn House School, Parkgate. He began his military training at Christ Church, Oxford, last February, was appointed to the R.F.C., obtained his commission in May, and received his "wings" and pilot's certificate in August. He should have proceeded with his squadron to the front last week. He was flying over the sea on Nov. 5th when his machine appeared to collapse suddenly, owing to the breaking of a wing, and he and his observer fell into the sea with the wreckage of the aeroplane.

LOWSON.—Lieut. Courtenay Patrick Flowerdew Lowson, Rifle Brigade and R.F.C. (killed in an aeroplane accident on Nov. 3rd), was the elder son of Mr. J. G. Flowerdew Lowson, Edinburgh, and was twenty years of age. He was educated at Boxgrove School and Winchester. He was entered at Christ Church, Oxford, but, owing to the war, did not take up residence. He passed through Sandhurst, where he was made under officer and, on leaving, in December, 1915, he was gazetted to the Rifle Brigade, and was immediately afterwards attached to the Royal Flying Corps. He went to the front as an observer in March, 1916, and did much photographic work, being present at the battle of the Somme. After taking out his pilot's certificate he was made instructor in flying, and at the time of his death had charge of a flight.

LEDUC.—Lt. Leduc, Canadian Contingent, attd. R.F.C., a French Canadian, was killed in Kent on Nov. 7th, while making an instruction flight.

McJANNET.—Sec. Lt. Arthur William McJannet. R.F.C., who was killed in action on Oct. 31st, was the fourth son of James McJannet, East London, South Africa, and Mrs. McJannet, Bedford. He was 26 years of age.

MILLER.—Lt. Archibald William Buchanan Miller, K.O.S.B., attd. R.F.C. (formerly reported missing, now believed killed), was the younger son of the Rev. T. D. and Mrs. Miller, of Kirkurd, Peeblesshire. He was educated at Fettes, where he acquitted himself with distinction, and played in the Eleven and the Fifteen. He entered Sandhurst in 1914, and was gazetted to a battalion of the King's Own Scottish Borderers. At the age of 19 he was sent in command of a draft to the Dardanelles. After the evacuation the regiment went to another front, and in 1916 Mr. Miller received a commission in the Royal Flying Corps. Mr. Miller was a grand-nephew of the late General Sir Archibald Galloway, K.C.B.

MOORE.—Lt. R. J. Moore, R.F.C., while carrying out a flight on Nov. 8th, fell into the Channel and was killed.

MOORE.—Lieut. A. J. Moore, R.F.C., a Canadian, was killed while flying near Montrose on Nov. 12th. His machine, after an explosion at a great height, came down in a spinning nosedive to earth. The dead body of the aviator was found in a field several yards from the wreckage of the aeroplane. Mr. Moore was about twenty-two years of age.

PRICE and CROAGER.—Lieut. Price, R.F.C., and Lieut. Croager, R.F.C., were killed in an aeroplane accident near Rugby on Nov. 9th. The machine fell from a height of 300 ft. Mr. Price died almost immediately, and Mr. Croager two hours afterwards.

PROUD.—Sec. Lt. John Reginald Stanhope Proud, R.W. Kent Regt., attd. R.F.C., who was previously reported missing is now reported killed in action on April 6th. Mr. Proud was the only son of Mr. and Mrs. T. Proud, of "Parkfield," Grove Park, Lee, S.E. He was 22 years of age.

Mr. Proud was educated at Quernmore School, Bromley, Kent, at Merchant Taylors', and St. John's College, Oxford, of which he was a scholar at the time of the outbreak of war. He was in the O.T.C. both at Merchant Taylors' and Oxford. When war was declared he was gazetted to the Royal West Kent Regt. on Oct. 16th, 1914. He went to France in July, 1915, and was wounded in January, 1916. Shortly after his return to duty he volunteered for the R.F.C. He gained his wings last January, and proceeded to the front early in March. He was recommended for promotion just a few days before he was killed. He was reported missing in the casualty list of April 13th, but the War Office now report that an official German list has been received, in which it is stated that he died on Good Friday.

RICHARDSON.—Sec. Lieut. Robert Harold Richardson, London Regt. and R.F.C., who was killed in action on Nov. 6th, was the son of Lt.-Col. and Mrs. T. W. Richardson, 104, Tollington Park, N.4. He was 25 years of age.

ROBERTSON.—A verdict of "Accidental death" was returned on Nov. 12th at an inquest on the body of Lieut. Duncan Alex. Robertson, R.F.C., who was killed on Nov. 11th.

RUSSELL and COOK.—A collision between two single-seater aeroplanes occurred on Nov. 12th, over Wallington, as a result of which two officers, Lieut. Russell, R.F.C., and Lieut. Cook, R.F.C., were killed. One of the officers had seen service in France and had been wounded, and the other was understood to be a learner. At the time of the accident he was engaged in a practice flight. The two machines were flying in company at a great height when the collision occurred. One of them fell immediately, but the other appeared to right itself, and it was descending when it suddenly crashed to the ground.

SHARLAND.—Sec. Lt. F. J. Sharland, R.F.C., who was killed in action on Oct. 24th, was the eldest son of the late Mr. F. C. Sharland and Mrs. Sharland, of Auckland, New Zealand.

TALLENT.—Sec. Lt. Albert Cecil Tallent, R.F.C., who was killed while flying at Shrewsbury on Nov. 4th, was the only son of the late A. C. Tallent, Esq., and Mrs. Tallent, of 37, Lordship Park, Stoke Newington, London, N. He was 21 years of age.

Engagements.

BARR—WILSON.—An engagement is announced between Capt. A. Douglas S. Barr, R.E. and R.F.C., elder son of Professor Archibald Barr, LL.D., and Mrs. Barr, of Westerton of Mugdock, Milngavie, and Maude Charlotte, younger daughter of H. Arnold Wilson and Mrs. Wilson, of Craigmaddie, Milngavie

COTTERILL—PEARSON.—A marriage is arranged, and will take place in December, between Capt. Eric Seton Cotterill Royal Fusiliers, attached R.F.C., only son of Mr. and Mrs Cotterill, Dore Moor, near Sheffield, and Lallie, second daughter of Sir C. Arthur Pearson, Bt.

KAVANAGH—MARTIN.—An engagement is announced between Capt. Henry Richard Kavanagh, Princess Victoria's (Royal Irish Fusiliers), attached R.F.C., only son of Hon. Kavanagh, of Gorakpur, late Superintendent of Police, United Provinces, India, and Sylvia, younger daughter of James Martin J.P., Surrey, of Bellair, Surbiton.

Marriages.

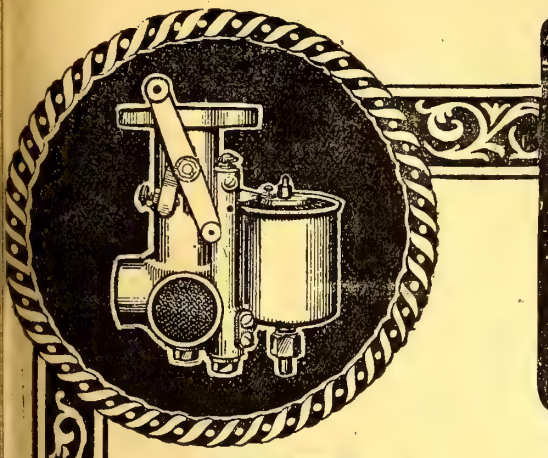
DIAMOND—GOODING.—On Nov. 7th, at Felixstowe, Suffolk, Lt. George Le B. Diamond, Essex Regt. and R.F.C., was married to Doris, youngest daughter of Mrs. Edward Gooding of Felixstowe.

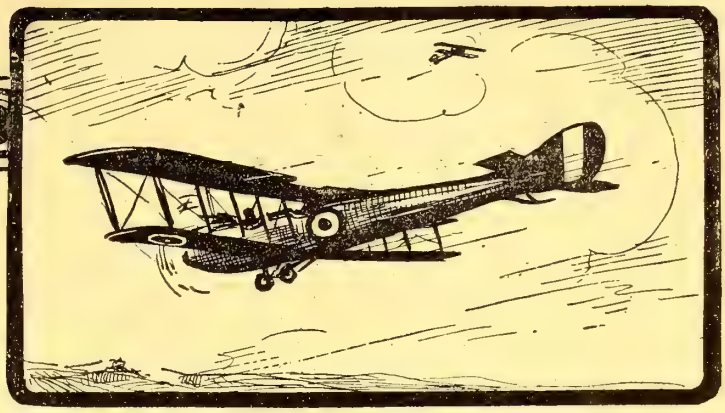
LONG—BLACK.—At All Soul's Church, Langham Place, the marriage took place of Lieut. Philip J. Long, R.F.C., son of Brigadier-General A. Long, C.B., C.M.G., D.S.O., with Eleanor daughter of the late Mr. John Stuart Black, of Ditton Hill Surrey, and of Mrs. Stuart Black. The Rev. Alfred Kelly, uncle of the bridegroom, officiated at the choral service, and the bride was given away by her brother-in-law, Mr. Collingridge. Mr. Lawrence Long, R.G.A., was best man.

MACLEAN—LEWIN.—On Nov. 8th, 1917, at St. George's, Hanover Square, Lt.-Colonel C. T. Maclean, M.C., R.F.C., was married to Maria Dorothy, only child of Mrs. Lewin, of Kirklevington Hall, Yorks, by Archdeacon Conybeare, assisted by the rector of St. George's.

MENDL—THOMAS.—A marriage has been arranged, and will take place at St. James's Church, Piccadilly, on Dec. 4th at 2.30 p.m., between Charles Tom S. Mendl, Lt., Devon Regt and R.F.C., elder son of Mr. and Mrs. S. F. Mendl, of 17, Hyde Park Street, W., and Beryl Althea, younger daughter of the late Mr. R. C. Thomas, of The Court, Merthyr Tydfil, and of Mrs. J. Baker White, The Cottage, Shaldon, Devon. There will be no reception, but any friends will be welcome at the church.

MORRICE—DE CRESPIGNY.—The marriage took place on Monday last at St. George's Church, Hanover Square, between Capt. William Morrice, Yeomanry, attached R.F.C., and Rose

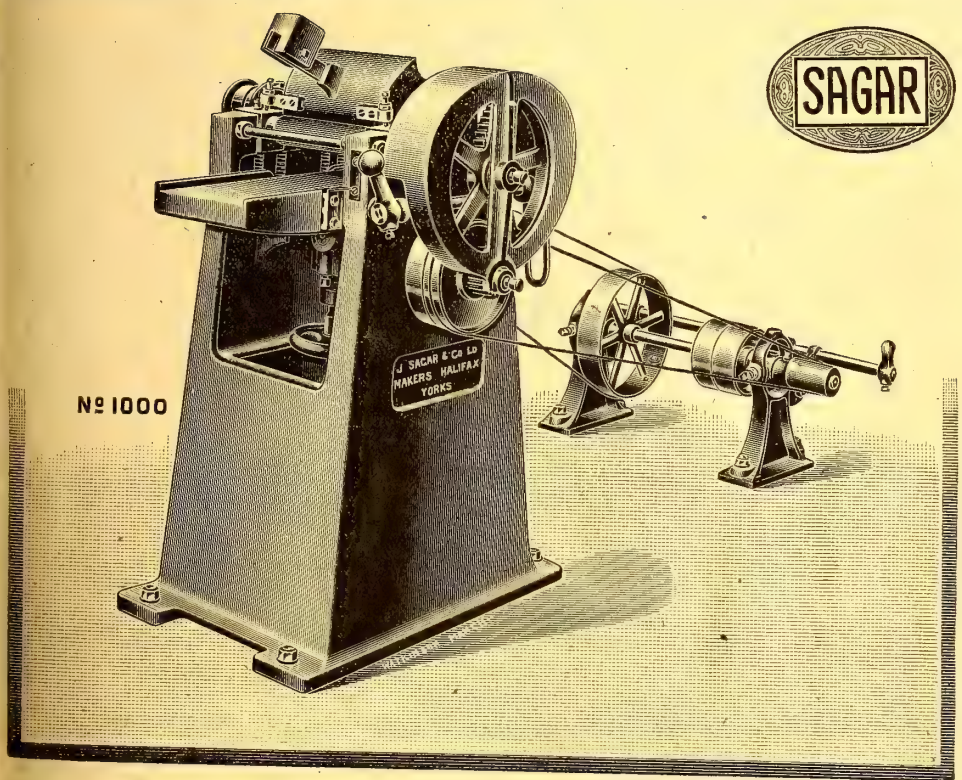




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widow of Lt. Norman Champion de Crespigny, Queen's Bays, of Hanover Court, Hanover Square.

REYNELL—LIDDELL.—On Oct. 8th, 1917, at St. Thomas's Church, Fifth Avenue, New York, Capt. Harold E. Reynell, R.F.C., was married to Georgiana Catherine, eldest daughter of Mr. and Mrs. John Liddell, of Shanghai, China.

SAMWAYS—LOGAN.—On Nov. 3rd, at St. Saviour's, Raynes Park, George Richmond Samways, R.F.C., was married to Hélène Estelle Norman, younger daughter of Captain William Logan, late the Gordon Highlanders, by the Rev. W. A. Birkbeck, M.A.

BIRTHS.

CARR.—On Oct. 29th, at Bay Tree Villa, Woodbridge, the wife of Capt. R. H. Carr, R.F.C., of a daughter.

EGERTON LETTS.—On Saturday, Nov. 3rd, 1917, at the residence of her father, the wife of Lt. M. Egerton Letts, Bucks, attd. R.F.C., of twin daughters (Gwendolen Hodgson).

Mr. W. T. Massey, writing in the "Daily Telegraph" from Palestine, on Nov. 2nd, of the recent fighting at Gaza on Nov. 1st-2nd, says:—

In the toughest part of the system they (British troops) were assisted by tanks, and during the night the Flying Corps silenced the Turkish batteries by bombing. Some enemy guns observed in the open by our aviators were caught by the fire of the heavy guns, the whole of the gun crews and the weapons being destroyed.

During to-day (Nov. 2nd) the Flying Corps reported that bodies of the enemy were gathering against our left. Heavy guns pounded them severely, and drove them into the area covered by howitzer fire, where casualties were inflicted.

* * *

Mr. W. T. Massey, writing from Palestine, says of the attack on Gaza:—

On Nov. 4th the Flying Corps again dropped several bombs on Sheria Station, on the Beersheba-Jerusalem railway, damaging the rolling stock, sheds, and stores in an important Turkish distribution centre.

The Turks appear to be shifting troops to prepare for the situation created by the attack and capture of Beersheba. Clearly the enemy was not ready, and is being harassed on the front, flanks, and rear, and his communications damaged by fire from the warships and by the work of the Flying Corps. The railway tracks and bridges north of Gaza were hit, and seaplanes got a number of hits on the Jilfulie bridge, north-east of Jaffa, on an oil factory at Haifa, and the military wing secured six hits on Sheria Station, where an enemy force was concentrated.

* * *

A Reuter's message stated that on Nov. 6th aeroplanes effectively bombed bodies of Turkish cavalry and the railway station at Um Dabkhal, scoring hits on a train.

* * *

Mr. W. T. Massey, writing from Gaza on Nov. 8th, says in the "Morning Post":—

The Flying Corps, too, has accomplished greater things than ever before in this theatre of war. The Turks as they were retiring last evening were badly mauled. Between Deir Seneid and El Medjel, near the coast, a number of aeroplanes dropped a ton of bombs from a low altitude on two bodies of Turks, numbering about 5,000, killing or wounding many, and then machine-gunned them and their transport. They afterwards bombed an aerodrome, which they hit, several machines in the open being damaged. One enemy machine was driven down in flames to-day. Twice to-day, too, large squadrons of aeroplanes visited an enemy aerodrome, where they damaged the hangars and machines, and fired on the troops.

* * *

The special correspondent of the "Times," writing on Nov. 8th from the British front, says concerning the fighting for Passchendaele:—

One tragic incident in the operation seems to have been the loss of seven of our gallant aviators, who were weatherbound, as reported in the official communiqué.

In my first dispatch I told how completely our aviators dominated the air over the battlefield, and how at about half-past eight, after a clear morning, a drizzle came sweeping up, blotting out the landscape, followed by heavy rain. I know what that rain was, as we faced it coming back over the old battlefield, and I can understand how helpless aeroplanes must have been with thick mist all around them and buffeted by the heavy squalls driving them always over the enemy's territory. One hopes that they landed safely somewhere over there, and if the Germans have any spark of chivalry they will have been received with the honours of conquerors, for certainly they held complete domination of the air until the elements themselves turned enemies.

FRANCE.

OFFICIAL COMMUNIQUÉS.

Nov. 8th.—In the course of the night of Nov. 6th-7th our bombarding squadrons dropped 2,300 kilogrammes (over two tons) of explosives on the railway stations of Thourout, Cortemarck, Roulers, and Lichtervelde. All the objectives were hit.

Nov. 10th.—Enemy aeroplanes dropped about 50 bombs in the region of Dunkirk. Three people were killed and 10 injured. The hospital of Zuydcoote was also attacked by the enemy aircraft, which dropped incendiary bombs. Seven persons belonging to the hospital staff were killed and nine wounded.

* * *

A message from Paris states that a Gotha which came down off the French coast on Nov. 4th carried four men. Coming from the direction of Calais, it passed over the cliffs at Sangatte, about 1 a.m., when there was a thick fog over the Channel. The crew displayed luminous signals, asking for lights to be shown so that he could land. Shortly afterwards the machine ran into the rocks off Cape Blanc Nez, and dropped on the beach between Sangatte and Wissant. It was impossible for the aviators to escape, and when the tide rose all four were drowned.

GERMANY.

OFFICIAL COMMUNIQUÉS.

Nov. 8th.—Since Nov. 3rd the enemy has lost in aerial battle and by our anti-aircraft fire 24 aeroplanes. Lt. Wüsthoff has gained his 24th and 25th aerial victories.

Nov. 9th.—In aerial battle and by our defensive fire the enemy have lost 13 aeroplanes. Lt. Müller gained his 32nd, Lt. von Bülow his 25th, Lt. Böhme his 22nd, Lt. Bongartz his 21st aerial victory.

Nov. 10th.—Lt. Baron von Richthofen has gained his 25th aerial victory.

Nov. 11th.—Lt. Wüsthoff has gained his 26th aerial victory.

Nov. 13th.—In October, enemy losses in aerial forces on the German fronts amounted to nine captive balloons and 244 aeroplanes, of which 149 were behind our lines, and the remainder were observed to have fallen beyond the enemy positions. We lost in battle 67 aeroplanes and one captive balloon.

Lt. Müller has gained his 33rd victory.

* * *

A Karlsruhe dispatch published in the "Frankfurter Zeitung" reports that aeroplane attacks were made on Nov. 1st on various towns and villages in Alsace-Lorraine.

The telegram states that just before midday five aviators threw 13 bombs on Mittersheim, doing no damage worth mentioning, and that an attack on Schlettstadt was made shortly after midday, with a like result, almost all the bombs falling in open fields, one only dropping near a waterworks, and this without effect.

Two and a-half hours later, according to the telegram, a larger squadron passed over Schlettstadt on its way to Offenburg, while four French aviators also flew over Colmar, where one man was wounded. One machine is declared to have been brought down near Colmar, containing the commander of the squadron and a pilot, both of whom are reported to have been killed.

ITALY.

OFFICIAL COMMUNIQUÉS.

Nov. 6th.—This morning an enemy aeroplane was brought down at Nervesa (35 miles west of the Tagliamento).

Nov. 7th.—During yesterday and last night our aeroplanes and airships repeatedly bombed enemy troops at work for the repair of the bridges on the Tagliamento or in movement across the river. Four hostile machines were brought down by our aviators.

Nov. 8th.—In spite of the strong resistance on the part of hostile machines, our aviators renewed the bombardments on enemy troops along the Tagliamento. Five enemy aeroplanes have been brought down.

Nov. 10th.—Last night five of our airships effectively bombed the crossing on the Tagliamento at Latisana and at Motta di Livenza (about 14 miles from the sea), and the troops moving on the roads leading to the river.

* * *

Among other new elements in the new Government no one seems to have been surprised at discovering the name of Signor Eugenio Chiesa, the Commissary for Aviation under the Ministry of Arms and Munitions.

* * *

Recent arrivals in England seem to show that distinguished pilots here have not all abandoned hopes of returning to the first-loved single plane flying machine.

* * *

Signor Feroldi's carburettor has so carried things before it both metaphorically and actually as to induce him to get the firm of mechanical constructors, "Mario Zanoletti," of Turin, to start it to make the instrument in series. Except the Turin-London, all the big flights recently mentioned have been done with its gas.

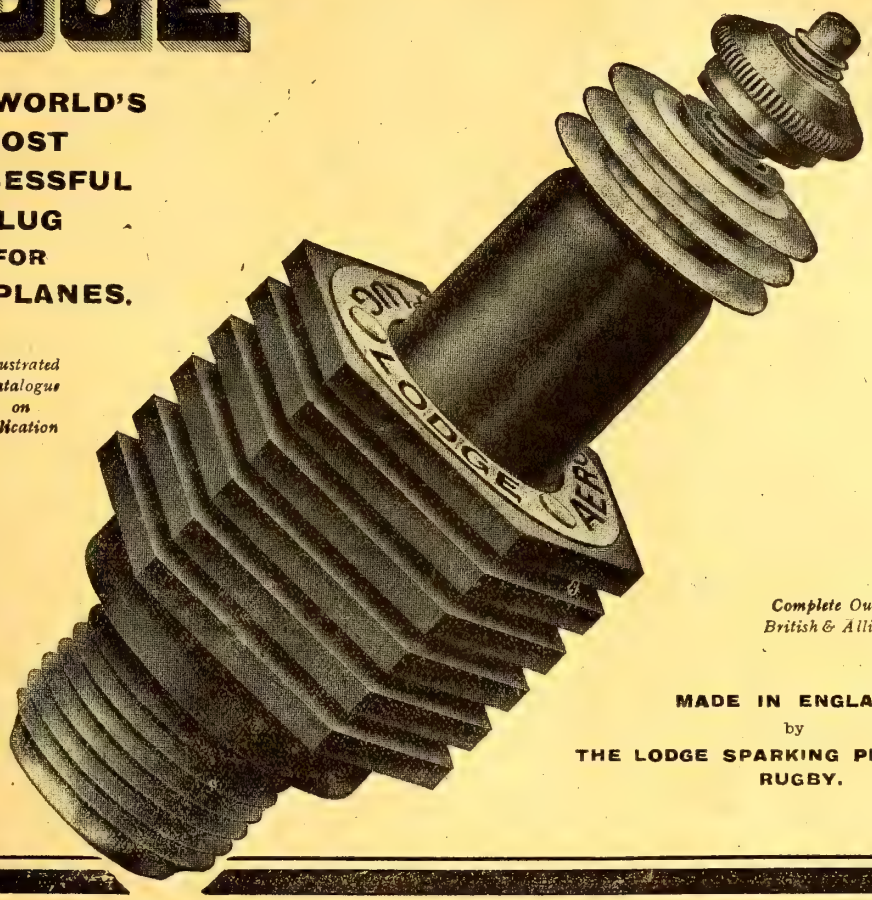
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The first mention of the German onslaught was concurrent with the mention of the first German 'plane fallen to an Italian

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pilot on this front. It appears that on Oct. 22nd, after several days of bad visibility, Captain Baracca, on a Spad, went a-hunting, and came across five Albatros D.III's, which he wisely avoided. Shortly afterwards he surprised two large green machines, "C.V.'s," and brought both down. That one which fell into Italian hands—No. 17— was manned by two Germans—Sec. Lts. Werner Zimmerman and Arthur Fischer; that is, if the "pink 'un" of this land be not in error.

Baracca is thus the "ace of aces," Lt.-Col Piccio taking second place for the time being.

* * *

One is allowed to speak in general terms of the 150 U.S. pilots who are, after a picturesque reception, now training hard for Hun-hustling in a southern flying school in this land.

* * *

The "new" machine which did so well in the recent round-about-Italy ride, piloted by Major Lombard (1,400 kilometres in six hours), and in Sérjt. Stoppani's Turin-Udine and Turin-Rome trips, is being called a S.V.A., Savoia-Verduzio-Ansaldo, presumably, and has a Spa motor, a 6 cyl., 2 by 2, water-cooled, vertical, overhead valved, 250 h.p., reminiscent of Austro-Daimlers.

Anyway, the Spa Co. engined the first ticket-taker in this country to fly a home-made 'bus, to wit, young Facciòli, as he then was. One is glad to congratulate this far-seeing firm.

* * *

Also one is glad to be allowed to state that the little Usuelli gasbag is getting some of its own back—not, I fear, the gas—on active service pirate-catching somewhere over the brineless sea.

* * *

The present-day "Vulcan" has charged the Lord-of-the-Air to print monthly a book of the wisdom of the air. One prays that it may have better luck than the half-dozen civilian editors here who failed over aerial papers.—T. S. Harvey.

RUSSIA.

Official Communiqué.

Nov. 9th.—On the Rumanian Front, in the region of Nantiu, 15 miles north of Focsani, on the evening of Nov. 7th, three of our aeroplanes fought two enemy machines, which were brought down and fell in the enemy's lines near the village of Prissaka.

HOLLAND.

A Reuter's message states that the three occupants of the German aeroplane which made a forced landing in Holland on Sept. 29th, after taking part in the attempted raid on London the previous evening, informed the Dutch authorities that they had only reached Ramsgate, where they had dropped one bomb. They stated that they had been unable to proceed beyond Ramsgate owing to the fog and the heavy firing from the English coast defences, and that they were bringing back the rest of their bombs to Ghent when forced to land in Holland.

The officers wrote out a telegram in German, however, informing the Berlin authorities that they had successfully bombed London and had made a forced landing in Holland.

CANADA.

Mr. James Carruthers, of Montreal, ex-President of the Montreal Board of Trade and President of the Canada Steamship Lines, has just offered to the British Government a gift of four aeroplanes for use on the Western Front. The Air Board, in accepting the gift, has expressed "its warm appreciation of so generous a contribution."

Mr. Carruthers has already presented three aeroplanes to the Canadian authorities, and has given over a quarter of a million dollars to Canadian patriotic funds.

EGYPT.

It is reported that when Brig.-General Sir Robert Anderson was in Egypt he visited the Sinai front, flying from Cairo to Gaza (200 miles) in an aeroplane.

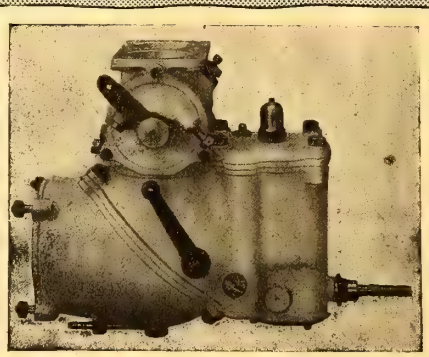
NASTY!

The following is an extract from the Hamburg "Nachrichten":—

"If the Entente Powers hail with a wild outburst of joy every bomb that is hurled on our Krupp works, our aviators may well attack London, the British Essen and Hamburg joined in one city. More shamelessly than in that way English cant can really not express itself when they characterise the attacks on this city as criminal because women and children may be injured.

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CIVILIAN FLYING SCHOOLS.

No doubt many youngsters who are approaching military age, especially those who read this paper, are anxious to get into one or other of the Flying Services, and they or their parents are prepared to put down the money to have them trained as pilots so that when they apply for an R.F.C. commission they may have the initial advantage of having already taken their certificates. Such youngsters, and their parents, should exercise very great care in choosing the particular school at which they intend to learn to fly, as it is quite possible that they may find themselves eventually minus their money and without a "ticket," owing to their passing military age before they qualify, or owing to the school being shut down and the aerodrome being taken over by the military authorities.

This paper may safely claim to have done at least as much as anybody to fight the battle of the civilian flying schools when at the outbreak of war the authorities adopted the policy of shutting down civilian flying schools and training all pilots at Service schools. It was then possible to prove definitely from figures that the civilian schools were actually more efficient in training pilots up to the point of taking their certificates than any of the Naval or Military schools, though the Service schools had in any case to do all the work of higher education.

Unfortunately, in many of the civilian schools the system of training to-day remains practically exactly as it was at the beginning of the war, whereas the Service system of training has improved immensely in efficiency. Consequently, not only are Service-trained pupils actually trained more quickly than in most of the civilian schools, but in many cases pupils who are supposed to have taken their certificates at civilian schools have to be taught all over again when they go to a Service school for higher education, and actually take longer to train after their arrival than if they had never been in an aeroplane before.

There certainly are some civilian schools where the system of training is excellent, but judging from various accounts which have reached this office there are others to which it is pure waste of time and money to send a youngster.

The War Office has given practically all civilian schools a sporting chance of making good. Pupils have been sent in batches of anything from half a dozen to a couple of dozen, and the War Office cannot be blamed if, after finding in almost two years of this kind of business that certain schools cannot train pilots in reasonable time, they make up their minds not to send those schools any more pupils.

A friend of the writer's, and R.F.C. officer, recently investigated one school which he says consists apparently of a chief pilot, a managing director, two mechanics, and an odd man. He found five pupils at the school, and got into conversation with one of them, who said he had done twenty minutes' flying in a month. According to this pupil, he went up to the aerodrome when he pleased, and hoped to get his "ticket" some day.

The observing for certificates was apparently done by a man who lived in the neighbourhood who turned out for the job when he was wanted. Apparently he was easily satisfied, and signed the papers no matter how badly the certificate tests had been done so long as the pupil got the machine off the ground into the air and did a few turns. The aviator says that at one time there were some R.F.C. pupils at the school, but they never did any flying, and were taken away. Some who were supposed to have taken their "tickets" were sent to an R.F.C. station of his acquaintance, and simply had to be taught to fly over again, as the best they could do was to hop along the ground.

He points out that at this particular school eight or nine men of military age were simply wasting time, and he suggests that at some schools there are youngsters who are deliberately keeping out of the Services under the pretence of learning to fly, whereas they would learn quicker and certainly better in the Services.

It certainly seems as if nearly all the civilian schools will have to alter their systems of training entirely if they are to keep pace with Service schools and justify their existence. If they do not justify their existence, then obviously it is better that they should be shut down and their staffs, grounds and sheds put to definite military use.

PRESENTATION AEROPLANES.

It certainly seems as if many of the civilian schools will have the Premier a cheque for £2,700 for the purchase of an aeroplane for the Imperial Government. A well-known pastoralist recently gave £1,000 towards the purchase of another machine and the balance of the purchase money is being raised by public subscription.

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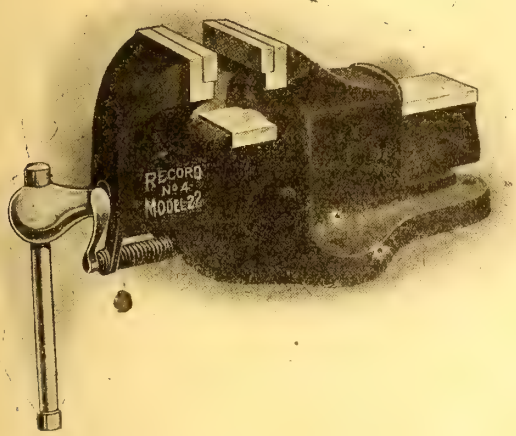
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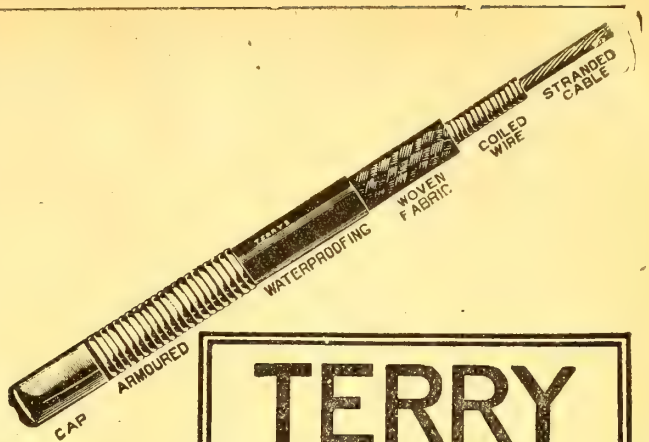
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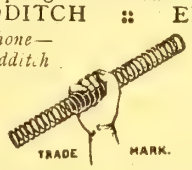
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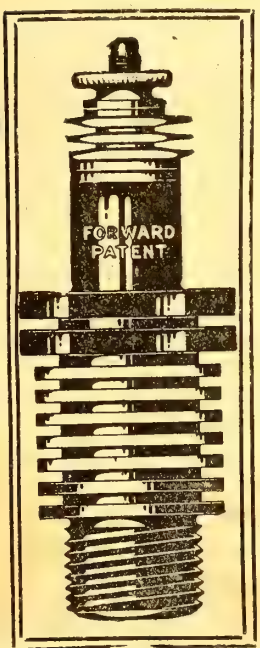
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AVIATION IN BRAZIL.

[The following notes on aviation in Brazil have been collated from "Auto-Propulsao," of Rio de Janeiro, by an engineer who knows the country intimately.—Ed.].

The interior of the State of Sao Paulo has been visited by the aviator, Bergmann to show the inhabitants what an aeroplane is like. The districts visited include the greater part of the coffee-growing territory, which produces some two-thirds of the coffee of the world. The towns at which the aviator gave his performances are little more than large villages by European standards, but there is a considerable population scattered round them on the plantations, each of which is a small village in itself.

This population is a mixture of Brazilians, white, black and between colours, Italian and Portuguese colonists, who constitute the working force of the plantations, and who, although fairly well off as regards food and housing, do not see a great deal of money, and consequently rarely travel to the capital, where aeroplanes have been fairly common objects for at least five years. Therefore this exhibition journey brought home to a large number of people for the first time the reality, appearance and capabilities of the new vehicle.

Away from the railways, travelling in Brazil is very rough and tedious. Perhaps the demonstrations will suggest commercial services in this interior district.

The methods of welcome and appreciation shown the flying man were characteristically Brazilian. The local paper of the town thus describes his reception at Mogy-Mirim :—

"After thousands of people had been waiting and watching anxiously among the reports of rockets and the strains of music, there came in sight at a height of 1,500 metres the 60 h.p. Morane monoplane, ably piloted by the intrepid Luis Bergmann, of the Brazilian Aero Club, over the warmest ovations of the multitude, who elbowed each other on the landing ground. It was an indescribable spectacle. The people were seized with delirium when they saw the aeroplane.

"After performing a glide and various manœuvres, the pilot made a fine landing, amidst the plaudits of the people, and was carried shoulder high by a group of admirers.

"After greeting the local authorities, he was entertained by the Mayor and other notables to champagne and dinner at the local hotel, and then conducted to the local club, where he was received with music, applause, and charming young ladies, and complimented in the name of the town by a local orator. After this a lively dance, and next morning the aviator flew off for his next calling-place."

If this is a fair sample of the pilot's daily experiences, the journey must have been a good test of his capacities in more ways than flying.

AEROPLANES FOR THE POLICE.—In the State of Parana a public subscription is being raised to present an aeroplane to the police force of the State. It may be explained that the police forces of the Brazilian States are organised on a military basis. By the Federal Constitution, these forces must not include artillery. Machine-guns and aeroplanes were not prohibited for an obvious reason, and the former are possessed in considerable numbers by some of the State forces. Aeroplanes are a new item. They seem well adapted for true police work in countries like Brazil, with poor communications and a scattered population.—H. M. S.

AIR RAID COMPENSATION.

It was announced in the House of Commons recently that owners of property not exceeding £500 in value are to be compensated by the Government for damage done by air raids and bombardment without paying any premium. Where the property exceeds £500 in value, the owners will receive compensation up to £500 without the payment of premium, provided that they have insured under the Government insurance scheme in respect of the value in excess of £500. The new scheme is to take effect from September 1st.

THE ATLANTIC FLIGHT.

According to the New York "Tribune," the Handley Page Co., of London, has sent officials to the U.S. to plan the trans-oceanic trip, to take place early next spring.

The step was decided on, it was learned, to offset the commercial competition of the Caproni Co., which had already announced that it will send a machine on the long air-voyage. The Italian concern's demonstrators have made spectacular flights in this country, and have already won a favourable position here.

Secret conferences, in which British and American flying experts have taken part, have been held in this city recently. There are certain mechanical difficulties which are being overcome in preparation for the flight.

Mr. W. H. Workman has represented the Handley Page Co. at these sessions. He went to Springfield, Massachusetts, recently in connection with the flight, and it is thought that a definite announcement will be made by him or his associates on his return.

A NEW MOVE.

It should be noted that Mr. F. C. Nestler has joined Mr. James Putman, the well-known tentmaker, of Aylesbury, with whom, during the last two months, he has been actively engaged in the construction of portable hangars of the F. C. Nestler type.

Mr. Nestler has severed entirely his connection with the firm which bears the name of F. C. Nestler, Ltd., Greycoat Street, Westminster, and, although his name has so far been retained as the title of this company, he has not been associated or connected with this firm in any way since June last.

One may mention in passing that the hangars constructed to Mr. Nestler's design are very largely used by the Flying Services, their success being due to their simplicity and great strength in design, combined with rapidity and ease of erection, while their durability leaves nothing to be desired.

Remarkable progress has been made, and important developments may be expected from the excellent business organisation of Mr. James Putman, of Aylesbury, with whom Mr. Nestler is now associated. At the moment this firm employs over 1,500 workpeople, and the works cover eight acres of ground.

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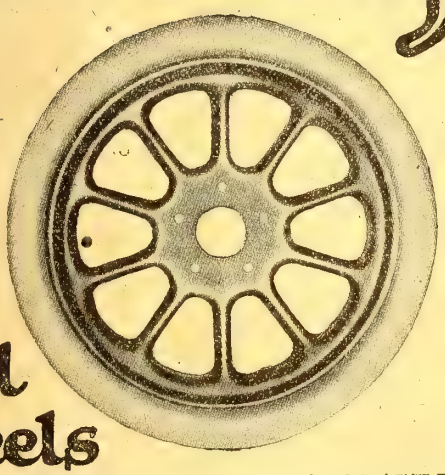
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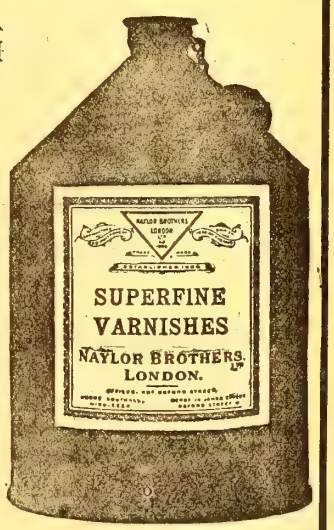
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AN EXTENSION OF PREMISES.

The recent opening by Mr. Joynson-Hicks, M.P., of the new premises of W. G. C. Hayward and Co., Ltd., of Twickenham, is a matter for congratulation to the proprietors. The firm were one of the first—perhaps the first—of the smaller companies to realise the supreme need of an increased supply of aeroplane engines. Accordingly, the management set themselves to specialise in this particular branch of a rapidly growing industry, and by careful work, on original lines, achieved considerable success.

They were able to render conspicuous service to several of the large firms, who, in the unique conditions of the early days of the war (when shortage of engines necessitated a larger supply of spare parts for repair work), were hard put to it to keep pace with the Government requirements, and who found the company's co-operation of great value.

The new works are equipped with modern and up-to-date machinery, and particular care has been taken in their arrangement and construction to ensure both the comfort and efficiency of the workpeople, for whose use model canteens have been provided.

To its aviation business the company have recently added an undertaking previously carried on by means of exports from Austria-Hungary, which will now be developed by the manufacture of goods in this country by British labour under favourable conditions.

A NEW AMERICAN CONCERN.

Messrs. Henry M. Leland and Wilfred C. Leland, who recently resigned as president and general manager of the Cadillac Motor Car Co., Detroit, Mich., have completed the organisation of a 1,500,000 dol. company.

The concern has been incorporated as the Lincoln Motor Co. and has a factory composed of buildings formerly occupied by the Rands Manufacturing Co. One hundred men are now at work and it is announced that 2,000 will be employed soon. An output of 20 aeroplane engines per day is planned.

M-L MAGNETOS.

The new works of the M-L Magneto Syndicate, Ltd., at Coventry, which have been occupied for little more than a year, are already running at full capacity, and the ever-growing demands for "M-L" magnetos are causing continual extensions.

At the present time the firm is almost exclusively employed on Government contracts, against which they are turning out each week large numbers of magnetos.

After the war it is intended to specialise on a complete range of motor cycle types, together with a magneto specially designed for 4 and 6 cylinder light car work.

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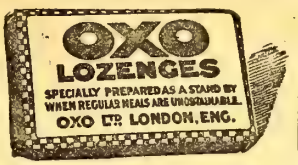
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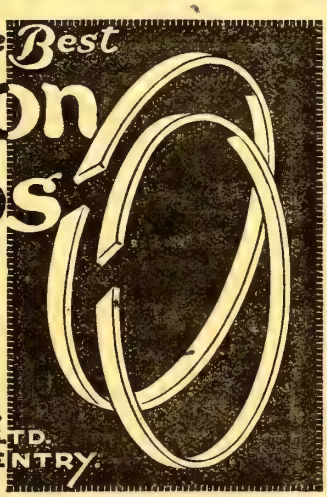
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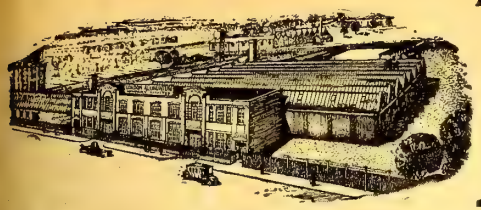
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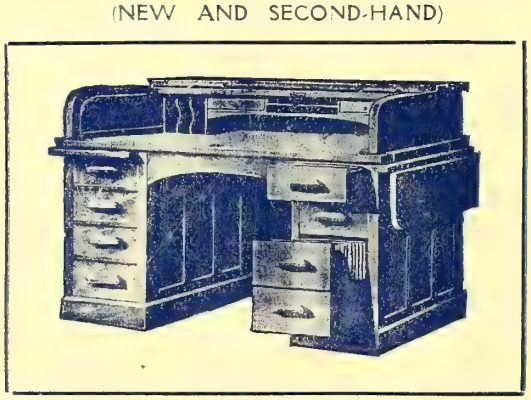
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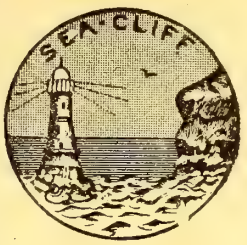
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ON THE AIR FORCE BILL.

If anything could abolish effectively any respect one may have had left for the elected representatives of the British People it would surely be a full report of the debates on the Air Force Bill. Scarcity of paper prevents the publication of such a report, and it is only possible to give a very brief précis of the proceedings, but readers may rest assured that they have not lost anything by the absence of a full report. Rather they have gained, because they have been spared the trouble of wading through columns of meaningless cackle. An attempt has been made to give the main lines of argument followed by each speaker, but, taking them all round, the arguments were so weak and generally so ill-informed that it would have been absurd to expect anyone to be convinced by them.

The most striking feature of the whole performance is the fact that on this great historic occasion, when the Elect of the People were creating a great New Service, bigger than our standing Army and the Navy as well, a service on which the safety of this country will depend in future wars, a service to which the winning or losing of this present war may be due, out of some 600 and more members of the House of Commons less than 150 took the trouble to be present. It is not clear whether the absence of the other 450 or so was due to an unmerited, if touching, faith in our patchwork Government, or merely to sheer mental incapacity to understand the importance of the issues at stake. The fact remains that less than 25 per cent. of our elected legislators took the trouble or had the intelligence to attend the final debate. A debate on the working man's beer, or even on religious education, would have secured far more attention.

Of the Bill itself one can only say that it is thoroughly skilfully drafted, so that it means nothing definite, so that the Government can do exactly what it pleases when the Bill becomes law, so that none can say that anything which is done later on is contrary to anything in the Act, and so that officers and men of both the Flying Services are absolutely at the mercy of the Government and its friends.

For once one would find oneself entirely in sympathy with their Lordships of the Admiralty if they availed themselves of their rights under the Bill and refused flatly to let their seagoing aircraft pass over to the new Air Force, and merely consented to releasing the shoregoing section of the R.N.A.S.

So far as one can find any definite plan in the Bill, it seems to embody all the worst features of Mr. Pemberton-Billing's original "Imperial Air Service" proposition of 1915-16, or earlier, and to disregard entirely his more recent admissions that after all a sailor is a sailor and a soldier is a soldier, and that perhaps the best way out may be to make a third and separate Air Service to conduct Air War, apart from the aeronautical branches of the Navy and Army. In fact, the Bill seems to combine, in its drafting, the sweeping methods of Mr. Billing, the astuteness of General Henderson, and the narrow outlook of Mr. Bonar Law. Truly, it is a wonderful composition, and it is not surprising that the limited intellects of our legislators failed to debate it to any effect. One can only hope, and pray that when it becomes an Act of Parliament and its machinery is actually set in motion it may be administered by people to whom the honour and efficiency of the Air Force—or whatever its name may be—are more than their personal interests, for, as at present framed, the Bill leaves everything entirely at the mercy of the politicians who have come so near to ruining this country in spite of the gallantry of the King's Armed Forces and the self-sacrifice of the majority of the people in all walks of life.

The only humorous moment in the debate occurred when Mr. Billing supported a new clause proposed by Colonel Gretton—a clause to prevent the Air Council from making war on its own account. The clause would have knocked the whole bottom out of the Air Force, so apparently Mr. Billing supported it in order to make sure of having it defeated.

Two reasonable proposals to make the title of the new Force the "Imperial Air Service" were turned down promptly, on the inadequate grounds that Canada and Australia would have to be asked first, and that the R.F.C. might object to the words "Air Service" being applied to it—apparently the Navy having a copyright on the words.

As regards the word "Imperial," perhaps Major Baird will explain why the R.F.C. in Canada call themselves the "Imperial Royal Flying Corps" on paper? It cannot be both at once. It might be Imperial by virtue of being a Corps formed from all parts of the Empire, and Royal because the King is its Colonel-in-Chief, so it might the "Imperial *and* Royal Flying Corps," but it cannot be "Imperial Royal." The objection to "Air Service" is futile if both the R.N.A.S. and R.F.C. are to disappear.

Possibly the Government's fondness for Air Force is due to the fact that ultimately the force must become Royal, and so will be known as the R.A.F., thus perpetuating sweet memories of the days when the Royal Aircraft Factory was supreme in the governance of aeronautics. If, on the other hand, it becomes Imperial, it will be known as the I.A.F., which may be confused with Imperial Australian Forces, and so particularly please Canada, British Guiana, the Isle of Man, and other Overseas Dominions. Why the title Imperial Air Service—to which everyone in the Flying Services is accustomed—should be turned down is only explainable on the hypothesis that it was originated, like the scheme of the Bill itself, by Mr. Pemberton-Billing, and that the Government fears that if it adopts the title as well as the scheme, Mr. Billing may claim to be the Father

of the Air Service—a truly horrible prospect, of course, from the point of view of those who are responsible for concocting this Bill.

Of one thing everyone may rest assured, the Army does not want an Air Force separate from itself and yet operating with it. The R.F.C. has proved itself worthy to be an integral part of the British Army, and most of the R.F.C. are proud of the fact. Slowly but surely the Navy is coming to think in like manner of the R.N.A.S., and in a short time it would be possible for naval aviators to become accepted as Naval officers.

Do those responsible for the Bill think seriously that the Army's air work will become more efficient if carried out by a separate Service? And what do they think will be the position of an Air Force officer on board ship, a tenant of the Ward Room on sufferance, lower than the engineers, paymasters, and doctors, who are, after all, pukka R.N., and a degree worse than His Majesty's Jollies—a kind of sub-Marine, in fact? A truly pleasing prospect for officers who have spent the last five or six years in learning all about flying.

On the other hand, despite Colonel Gretton, there is room for an Air Force, or Imperial Air Service, which would carry on air war on its own account, without reference to the two senior Services, and, that being so, there is room for an Air Council and an Air Minister, to co-ordinate supplies of men and material, and to see fair play between the three Services, as would be necessary to prevent unfair competition.

The present scheme will be made to work somehow, because of the loyalty of the officers and men who have built up the existing Flying Services, but, as usual, our lack of statesmen and our superfluity of politicians has caused us to make a mess of what might have been a very great scheme for the strengthening of the King's Armed Forces.—C. G. G.

The Debate on the Air Force Bill.

The Air Force Bill was considered in the Report stage and in Committee in the House of Commons on Nov. 14th. The first motion concerned the authorisation of the payment of money for salaries and remuneration and to make provision for the establishment of administration and discipline of an Air Force, the establishment of an Air Council, and for purposes connected therewith.

Mr. Pringle, who opened the debate, wanted to know why the £2,000 a year paid to the President of the Air Board should be raised to £5,000 for a President of the Air Council as a Secretary of State. He wanted to know if this had anything to do with the personality of the proposed Secretary of State. Mr. Pringle said that statements had been made that the Air Minister was to be Lord Northcliffe. If that were so it was natural that he should desire to be made a Secretary of State, nothing less being in accord with his merits and authority in the country, but a lesser person might be satisfied with a position of less dignity.

Major Baird said that so far as he was aware no choice of an Air Minister had been made.

General Sir Ivor Philipps said there was nothing in the Bill and that there was nothing said from the Government Bench that satisfied him that it was a bona-fide attempt to set up an Air Force, and that as the Bill did not create an Air Force there was no necessity to pay a Secretary of State to control that Force.

Mr. R. Harcourt thought that it would be advisable to mention the name of the proposed new Minister.

Mr. Outhwaite objected to the presence on the Air Board of members of firms who are contracting for aeroplane supplies, and said he would be very sorry to see this system perpetuated in the new Air Service, and referred to accidents which might be caused through the failure of an engine which had been supplied by a firm in which a member of the Board was interested, and desired that members of the Air Council should be provided with such salaries as would enable independent men outside contracting firms to take seats on the Council.

Mr. Watt made some extraordinary remarks about gentlemen at the Air Board who ostensibly do their work for nothing and direct the orders of their departments into the companies with which they are associated. He also said that there were petrol interests concerned, etc. The Committee should not pass a financial resolution without knowing clearly how the money was to be expended.

[Neither Mr. Watt nor Mr Outhwaite seemed disposed to explain how one is to get competent men to run a specialised department where technical knowledge is needed without having in that department officials who have acquired the necessary experience because of their connection with firms in the same line of business.]

Mr. Pemberton-Billing objected that everything in the Bill is to be done by Order in Council, and that members of the House of Commons would have no right of control.

Major Baird said that there was no intention on the part of the Government to conceal from members any information they might desire to have. The whole question was as to what was the proper moment to give this information. Nobody could tell how the work of the Air Ministry would develop. Power was taken in the Bill to create a Parliamentary Under Secretary and a Parliamentary Financial Under Secretary, the work of the latter falling within the province of the Ministry of Munitions. These officials would be paid the same as others in similar offices.

It was proposed that the Air Council should consist of a Secretary of State, a Chief of Staff, and probably a Sub-Chief of Staff. There would be an officer to control personnel and an officer to control matériel, the latter being similar to the Director-General of Ordnance. The question of land was so important that it might be desirable to have a member of the Council to deal with it.

As to the appointment of men connected with the aircraft industry, he said that in a highly technical matter like this it would not be right that such men should be debarred or limited in any direction. In peace time it might be wise to confine appointments to politicians, but it would be a great misfortune to carry out that principle in war-time. People connected with the aircraft industry had rendered magnificent service, and he hoped that they would continue to do so.

The report was agreed, and the House went into Committee.

On Clause 1 **Major Baird,** replying to **Mr. Billing,** explained that the discipline of the Air Force would be subject to King's Regulations, and that if the Bill were passed the discipline of the force could not afterwards be altered without the consent of Parliament.

Sir F. E. Smith, the Attorney-General, explained to various objectors that the Bill did not give the Air Minister any powers other Secretaries of State did not possess.

On Clause 3 **Mr. R. Harcourt** moved to omit words which make the transfer of men to the Air Force subject to the approval of the Admiralty or Army Council, and suggested that this provision might result in a substantial part of the personnel being withheld from the Air Force. He also suggested that to offer a man the option might place him in a more difficult position than if he were taken over automatically. Speaking with three years' experience as an anti-aircraft officer, Mr. Harcourt said that if a man changed over from another Service at his own option people might think that he was after a job or playing for his own hand.

Mr. Bonar Law explained that the whole Bill was based on the goodwill of the two departments now working harmoniously on the Air Service. The basis of the Bill was that the whole Air Service should become one new service, independent either of the Admiralty or Army Council; both the Navy and the Army loyally accepted it. As to voluntary transference of officers and men, if an officer transferred to the Air Force preferred to go back to his old service he would not be retained, for this was a service which required nerve and enthusiasm, and it was quite obvious that no one would be retained for a minute if the man himself felt he would rather be in some other position. Experience in the war had shown that instead of people wanting to go out of the Air Service the inclination was to remain in it.

Further, **Mr. Bonar Law** said: If my hon. friend refers to mechanics and people of that kind, there need be no apprehension, since their position is really much better than under either the Army or the Navy.

General Sir Ivor Philipps said that he thought the announcement concerning the taking over of the whole of the Flying Service should have been made on the Second Reading. He had pressed for it then, and had got nothing. He thought that if the voluntary arrangement were retained the Air Force would not get all the men it wanted. He recalled that from the moment outside agitation began the Admiralty started from that moment bringing all the naval officers in the Flying Services more firmly under the Admiralty, and started making air machines in the dockyards. There were also technical questions as to the respective ranks of officers of the Navy and Army when transferred to the Air Force to be considered.

Sir Henry Norman also objected that this was a permissive Bill only.

Lord Hugh Cecil supported the Bill as it stood, and said that he greatly disliked compulsory service, necessary as it is in time

of war, and he believed that we would get a better spirit in the Air Service if it were based on voluntary choice.

Colonel Weigall objected to the creation of new administrative machinery such as duplication of the work of the Quartermaster-General and the Director-General of Ordnance as absorbing more man-power and money-power for self-contained administrative machines. He suggested that these Air Services would remain more economical and effective under the Army Council.

Mr. Joynson-Hicks expressed the hope that in the event of any officer or man desiring not to be transferred, that officer or man would not remain in some other kind of Flying Corps, but would be sent back to some other section of the Army. No residuum of a Flying Corps should remain in connection with the Army.

Mr. Lynch advocated that the transference should be automatic and not optional.

Mr. Billing said that from personal experience in the Service, if the Army and Navy were going to have control as to who should or should not be transferred to the new Service, the Air Minister and Air Council would spend their time corresponding with the respective older Services trying to get men transferred. He wanted to know whether officers and men with—say—ten years' service in the Navy were going to be transferred with or without seniority into the Air Force against their will. He also wanted to know whether the transference included anti-aircraft guns and airships, as the latter were not under the control of the Air Board.

If they were going to hand over everything to the Air Council they were doing a reckless thing so far as the Grand Fleet was concerned. Surely it was impossible that aeroplanes specially constructed for service with the Grand Fleet were going to be handed over piecemeal to the Air Service. He asked the House to consider seriously the advisability of giving the Air Minister power to conscript naval officers with long seniority and sea service into the Air Service. He thought that it should be compulsory on the Army and Navy to release men who volunteered for the Air Service, and not make it compulsory on men to join at the dictation of the Air Minister.

Mr. Watt thought that the Bill should be made a thorough measure by automatic transfer of men and material instead of making it a matter of consent and approval by the Admiralty and War Office.

Major Baird said that it had been specifically decided by the Government that the two Services were to be absorbed, and that there need be no fear of a residuum of R.N.A.S. or R.F.C. being left somewhere. The difficulty arising in having two different Air Services and supplying them with material and the danger of competition between the two made one horrified at the idea of having three competing Services. It was precisely for the purpose of eliminating competition that this Bill had been introduced.

Mr. Billing then moved his amendment to Clause 3 to leave out the words " and subject to the approval of the Admiralty or Army Council (as the case may be)." He did not wish it to be within the power of the Admiralty or Army Council to refuse a man permission if he wanted to join the Air Service. If a man wanted to join the Air Service and was turned down by his commanding officer, and afterwards pressed his request, he would become unpopular, and would be frightened to press his case for fear of being penalised for wanting to leave his present Service.

It was essential that the best men should be encouraged to apply for this Service, and not merely loaned by the Admiralty. This was not a war measure, but a Bill for the foundation of a Service upon which in the next two or three years the existence of the Empire would depend. The Bill should, therefore, make this Service a real thing, and not a temporary patched-up affair by which officers are borrowed from one Service or the other.

The amendment was negatived.

Mr. Billing further moved in Sub-Section (1) to leave out the words "not exceeding" ("For a period not exceeding four years"), and insert the word "of." As it stood, the clause bound a man to come in for four years, but did not bind the Government to keep him for four years. Cases had come to his notice in which pilots had been relieved of their commissions in an informal way and told that they had better put in as medically unfit, because of some friction with their C.O. If it was provided that a man should be retained for four years, unless there was some definite charge against him, it gave him an opportunity to make good.

Major Baird said that it was not reasonable that the Government should give an undertaking to keep a man for four years.

Lord Hugh Cecil pointed out that the omission of the words "not exceeding" would mean that any officers attached to the Air Services would have to be attached for four years, neither more nor less. After a little practice his nerve might be broken and he might be quite useless for the Air Service.

Mr. Billing remarked that there are other people besides pilots in the Air Service.

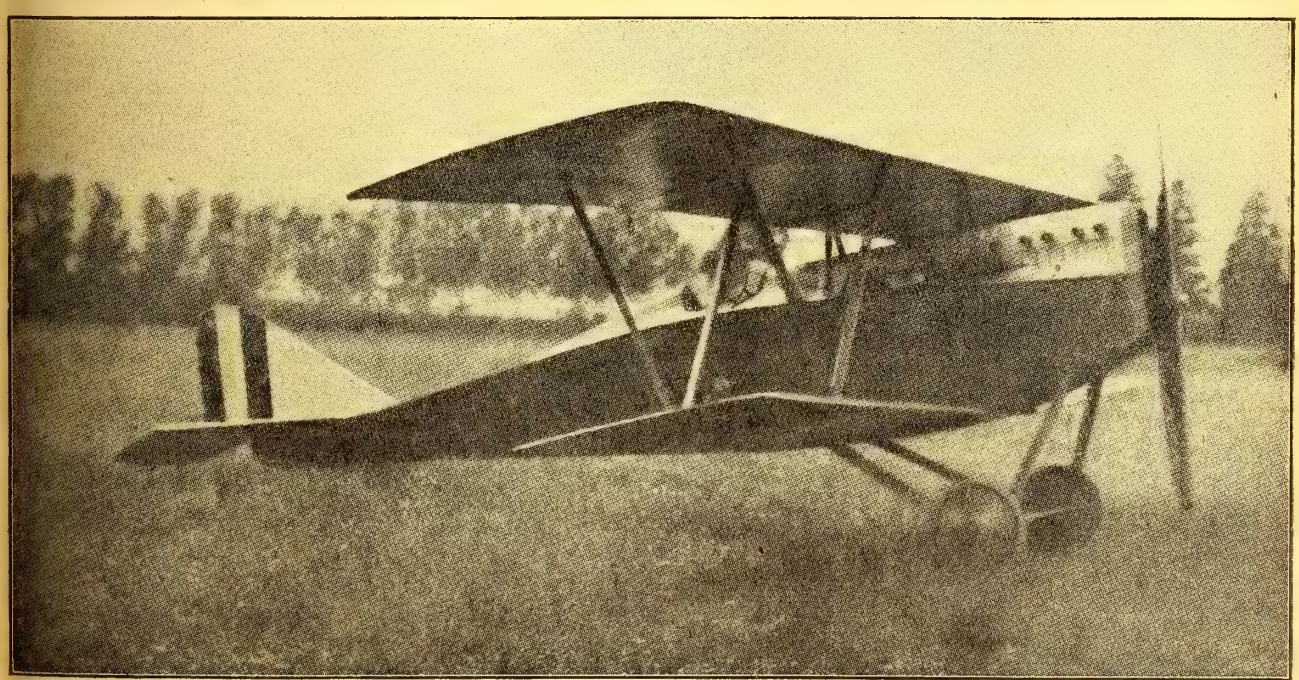
Major Baird pointed out that when a man permanently adopts the Air Service he is transferred. When he is attached it was proposed that it shall be for a period not exceeding four years.

Mr. Billing asked whether the principle was to try to avoid enlistment and to encourage attachment. This was going to lead to the very abuse which this House was anxious to prevent, namely, that this should be a temporary measure and that the Force should consist of naval and military officers temporarily lent for the purpose.

The amendment was negatived.

Mr. Billing moved to leave out the provision for the transfer of Air Service men qualified by the right to object within three months of the notice of the transfer being received, and for the limitation of service after transfer to the period for which the man would have been liable without the transfer. The Government must either make their proposal compulsory or non-compulsory.

Major Baird said it was useless to try to take men into the Service who did not wish to be there. A man who was automatically transferred and did not wish to be transferred might be too far away—in Mesopotamia, for instance—to object at once, and would, therefore, have three months in which to do



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so. It seemed right that men should be assured that transfer would not prolong their term of service.

General Sir Ivor Philipps said that those who were in the Flying Corps should remain in it. This was a dangerous clause. The one control over Service men is that they cannot "down tools." At any time during these three months anybody who had a tiff with his C.O., or did not like the food or the climate, might claim under Clause 3 to be allowed to return to his own Corps. It was absolutely an impossible situation in time of war.

Mr. Harcourt thought it was very serious that the Air Force should have to go for three months without knowing whether individuals intended to remain in it or not.

Colonel Gretton also objected to the clause because by it a man could escape performing a service which for one reason or another he did not wish to perform—that was destructive of discipline.

Major Baird said that this was merely a proviso to do away with the necessity of obtaining every man's individual consent. A man who left the Air Service had to go back to the trenches, where his pay was a great deal less.

Mr. Billing wanted to know what would happen to direct-entry men of the R.N.A.S. who refused to go over to the Air Force. All the trouble in the new Service would be encountered during the first three months, and yet every man was given the opportunity at the end of three months—when he would be most likely to be fed up—of clearing out. The clause should make it clear either that the men are going to be asked first if they want to come in, or that they are not going to be asked at all, and are not going to be allowed to leave till the end of the war.

General Hickman said that a man might not like to serve, but he would be attached—there was no difficulty at all

The amendment was negatived.

On Clause 6 **Mr. Billing** moved to insert the words, "The Royal Naval Volunteer Reserve," and pressed that officers of the R.N.V.R. should be put in the same position in relation to the Navy as Territorial Force officers were to the Army. If Reserve officers are to be trained for the Flying Services they should be equally trained for the Naval and Military Air Services.

Mr. Macpherson promised the point should be carefully considered before the Bill passed to another place.

On Clause 8 **Mr. Billing** moved that the Air Council should include a Director of Operations, Director of Air Defences, Director of Construction, Director of Personnel, and Director of Equipment, all of whom should be appointed under Letters Patent under the Great Seal, following the precedent adopted in the case of the Lords of the Admiralty.

Major Baird said that it would be impossible to lay down the exact appointments to be made, but he could assure the hon. Member that these matters would be fully covered by the appointments made.

The amendment was negatived.

Mr. Billing moved a further amendment to provide that the numbers of the Air Council should not exceed nine. He argued that it would lead to efficiency in the Service if an unwieldy Committee were prevented by such an amendment.

Commander Bellairs supported the principle of small numbers and quoted a French philosopher as saying that the greater the number of wise men assembled in a room the less the wisdom obtained.

Major Baird pointed out that there was no intention whatever of reaching the number of nine on the Council, but it was impossible to tell till they got to work how the Council would have to be sub-divided for efficiency. It was possible that, aviation being so important from an Imperial point of view, as it is likely to be in time of peace, it will prove desirable to have members from the Dominions as members of the Air Council. Therefore, he did not think it advisable to limit the numbers to an arbitrary figure.

Mr. Hogge supported the amendment.

Lord Hugh Cecil opposed it.

Mr. Billing pointed out that the number of the Lords of the Admiralty was limited. **Lord Hugh Cecil** said they were not limited by law.

On a division the amendment was negatived by 167 votes to 8.

Mr. Pringle moved that no member of the Council should be financially interested in any undertaking which supplies aeroplanes, aeroplane engines, or parts thereof, to the Government. He pointed out that the fact that one of the men who makes a decision on a technical subject is interested against any new departure is likely to create suspicion in the minds of disappointed men.

Mr. Watt supported the amendment, and said that he knew that outside the Air Board there existed among people skilled in aeroplane making the idea that they did not get a fair chance from the Air Board for their inventions and schemes. People who desired to exercise their ingenuity were choked off by what they considered ill-treatment at the Air Board.. If there were no men particularly interested in any manufacture in the Air Board that conclusion would not arise.

Mr. Billing supported the amendment. He suggested that if it could not be carried in its present form owing to the exigencies of war, perhaps the hon. gentleman in charge of the Bill would amend the clause so as to provide that when war does not exist no member of the Air Council shall be in the position described. He said that it was easy to find people capable of holding positions on the Air Council without going to members of the Trade.

Colonel Lowther at this stage protested against the emptiness of the House, and pointed out that there was not one Cabinet Minister present. He would like to see more members taking an interest in what was to become our greatest Service.

Major Baird pointed out that if this amendment were accepted, two gentlemen who had rendered greater service to the Air Service than any two individuals have would not be qualified to sit on the future Air Council. Obviously the last thing any man would do would be to bring forward anything in which he was personally interested.

General Sir Ivor Philipps pointed out that it had been said over and over again from the Front Bench that the principles of this amendment were going to be enforced. He was surprised to hear a member of the Government stating that the people employed by the Air Council are to be those who have private interests in other matters. He believed the result of the introduction into His Majesty's Forces of such a principle would be quite impossible. It seemed to him incredible and he did not believe the country knew it.

Major Baird asked whether the hon. and gallant gentleman would apply the same principle throughout the whole of the Ministry of Munitions.

General Sir Ivor Philipps said that he would not, but that he would apply it to this Council. He saw no objection to a great technical expert being an adviser, or even a paid adviser, but that was a different matter from his being on the Council and practically a member of the Government placing the orders.

Colonel Gretton said the dilemma seemed to have arisen out of an attempt to set up a civilian Department to run the war. Directly a civilian Department was set up one encountered the invincible ignorance of the ordinary civilian. The civilian who knows anything about a subject is the civilian who is financially interested.

Mr. Pringle referred to a gentleman in the West of Scotland who had submitted an engine to the War Office, who had consented to have it built. He had a long litigation with a member of the Air Board regarding the patent, and it was now impossible to get him to believe that the engine received a fair test. It was not a hare-brained scheme, because a former Air Authority had agreed that the engine should be built. He merely said that such a thing as this ought not to be allowed to occur, and wanted to provide in the Bill against it occurring in the future.

Major Baird said that it was obvious after the strong views that had been expressed that it was impossible to dispose of the amendment by a simple negative. He asked the permission of Mr. Pringle to bring the matter up again on the report stage. Whereupon Mr. Pringle withdrew the amendment.

After further debate on financial matters, **Colonel Gretton** brought forward a new clause to the effect that the Air Council shall not order warlike operations or make war by itself, but that it shall transfer and attach to the Naval and Military Forces of the Crown such corps, units, officers, and men of the Air Force as may be determined in agreement with the Admiralty or Army Council. He pointed out that there was nothing in the Bill to prevent the Air Council from conducting operations of war on its own account. He could conceive occasions when owing to public pressure or newspaper agitations the Government, in order to protect itself against possible outcry or overthrow, might use aeroplanes apart from Naval or Military needs, and starve operations of the Army or Navy.

Mr. Billing opposed the new clause because the Bill had been introduced for the purpose of doing a definite thing, and the new clause proposed what seemed to be a negative to the whole Bill. One thing that was essential was to have one supreme command outside the Army or Navy.

Sir F. E. Smith said that when contributions of Air Forces were made to the Army or Navy they would be under the command of the Army or Navy. If they remained independent, operations would take place under the direction of the Air Ministry, and most distinguished officers at the War Office had recommended that course to the House of Commons.

Colonel Gretton pointed out that the Attorney-General had not specifically included Naval sanction on this point.

After an argument between **Mr. Billing** and **Major Baird** as to what was an amendment to an existing clause and what was a new clause, the House agreed that the Bill be reported, to be considered on Friday.

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The Third Reading.

On the third reading of the Air Force Bill on November 16th **Colonel Gretton** moved a new clause, enjoining that the Air Council should not order or conduct warlike operations on its own account. He advocated that the Air Council should be a Board of Training and Supplying, and that actual operations of war should be entrusted to Naval or Military authorities.

Mr. Billing seconded the new clause, saying that if the proposal were carried out it would defeat those purposes of the Bill which were beneficial to the Service. Apparently he regarded his support of the new clause as the surest way of having it defeated.

Ultimately the Speaker ruled the clause out of order as being a direct negative to the Bill.

Mr. Billing moved to alter the name Air Force to Imperial Air Force. **Colonel Sir Hamar Greenwood** seconded the proposal.

Major Baird said that the amendment commanded the greatest possible sympathy, but it could not be accepted without consulting the Overseas Dominions, because the Military Authorities of Canada and Australia are practically autonomous, besides which Australia had got its own pilots.

Mr. Lynch, opposing the amendment, said that the word "Imperial" would stink in the nostrils of history and of all except those saturated with pro-German sentiments. **Mr. Billing** asked leave to withdraw the amendment, but the Speaker pointed out that it had already been negatived.

Mr. Billing then moved to insert the word "Service" instead of "Force," partly because Air Force did not sound well, and partly because the Air Force might in time of peace become a Government Service for peaceful purposes. **Major Baird** pointed out that it was essentially a Force which it was proposed to raise, and if the name Air Service were used the R.N.A.S. and the R.F.C. might resent the name being applied to the united Force. **Mr. Billing** said he did not press the amendment, and a division showed 90 votes to none against the amendment.

Mr. Harcourt moved an amendment which would have the effect of including anti-aircraft units in the Air Force. He pointed out that when he was in the Anti-Aircraft Corps one of his skilled gunlayers was taken away and turned into an officer's cook, because having entered the R.N.A.S. he was rated as an Aircraftsman and not as an Air Mechanic. A gunlayer in the R.N.A.S. meant an aeroplane machine gunner, consequently any other form of gunlayer, because he was not a photographer or a storekeeper, or something equally bloodthirsty, was written down in the unskilled grade of Aircraftsmen. He argued that if Anti-Aircraft gunlayers are taken over by the Air Force they would be given fair treatment.

General Sir Ivor Philipps, in seconding the amendment, drew attention to there being so few members in the House to discuss this important matter, though the other day when the enemy were chucking half-a-dozen bombs on London, and this very Anti-aircraft organisation were hurling tons of steel into the heavens, round came all the London members weeping and gnashing their teeth because they were not being protected, and were not satisfied with the organisation.

Major Baird agreed that the hard and fast line between the Flying Services and the Anti-aircraft gunners required modification, but that modification must be the result of experience. Nobody would argue that Anti-Aircraft gunners on board His Majesty's ships should be under the Air Council. Clause 3 made it quite clear that the Admiralty and Army Council may designate units for defence against aircraft, and they may be transferred or attached to the Air Force. [A.-A. gunners on board ships might just as well be under the Air Council as aviators on board ships.]

Mr. Billing asked whether the Anti-Aircraft Defence Corps were to be lent to the Air Force for service, and wanted to know whether kite-balloons and the anti-aircraft guns which protect them are to go over to the Air Force. The Chancellor of the Exchequer had made the dramatic announcement that the Air Service was going to take over everything, lock, stock, and barrel, and now his assistant made qualifications of that statement.

Commander Bellairs thought that the only way to avoid friction was to avoid taking over any anti-aircraft guns.

Mr. T. Davies pleaded for unified control of aircraft and guns alike, and said that many young men had been brought to their death simply because of the lack of unification of the Anti-Aircraft Service with the R.F.C.

The amendment was negatived.

Mr. Billing brought forward an amendment referring to the seniority of officers transferred to the Air Force. He mentioned the rapidity with which the R.F.C. promoted capable officers, and pointed out that the R.N.A.S., instead of promoting intelligent and efficient members of the Service, proceeded to add to it a number of "Naval dug-outs," who had not even a nodding acquaintance with an aeroplane. The result of the Bill as it now stood would be to give these men seniority according to their Naval service, and he could not see why fifteen years at sea should qualify a man to come into the new Service with fifteen years' seniority, whereas another with five years' flying would come in with no seniority at all. A Naval man who had not made a complete success of a Naval command might come into the Service with fifteen years' service, whereas a young Naval Lieutenant who had done admirable work all through this war, and possibly before it, might come in with only seven years' seniority, while a direct entry man with considerable experience who had made flying his profession might come in with only two or one year's seniority, or even none at all.

Major Baird argued that if this sub-section were left out great injustice would be done. An officer could not serve on a general court-martial unless he had held a commission for three years, and an officer might have had ten years' service and yet could not serve on a court-martial, if the clause were amended.

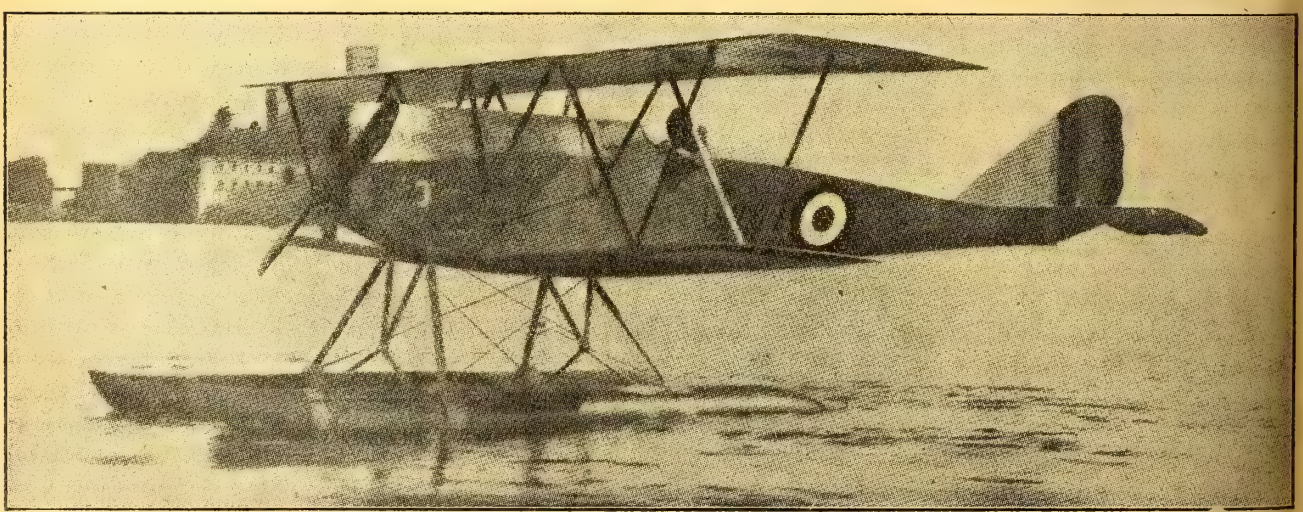
The amendment was negatived.

M. Billing moved that the Bill should apply to R.N.V.R. officers equally with Territorial Army officers, pointing out that Naval Volunteers ought to be treated as well as Army Volunteers. **Major Baird** pointed out that the Territorial Force were mentioned in the Bill, because there existed a unit of the Territorial Force in the Hampshire Aircraft Parks [otherwise the R.A.F.], and that R.N.V.R. officers came under the Bill as being at present engaged in the war.

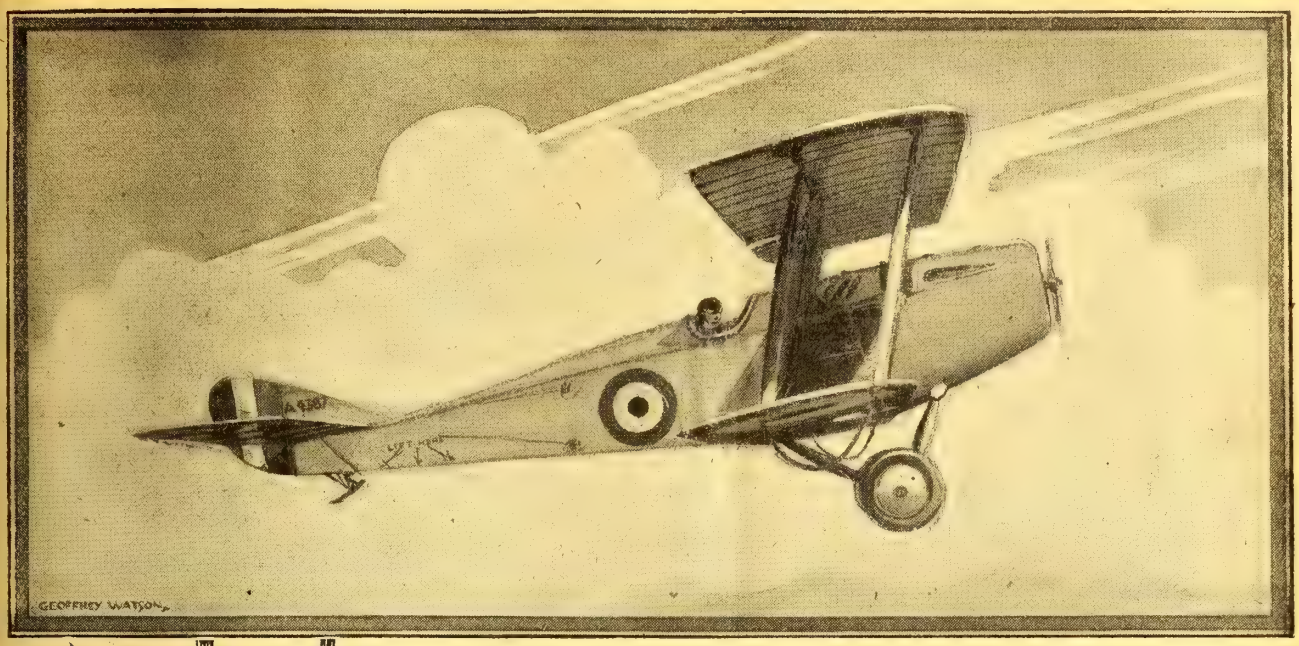
A further amendment of Mr. Billing's, making it lawful for the Board of Admiralty and the Army Council respectively to nominate Associate Members of the Air Council, with power to vote, was also negatived on the grounds that the Air Council as constituted would obviously keep the closest touch between all three Services, and would do its duties in relation to the Army and the Navy.

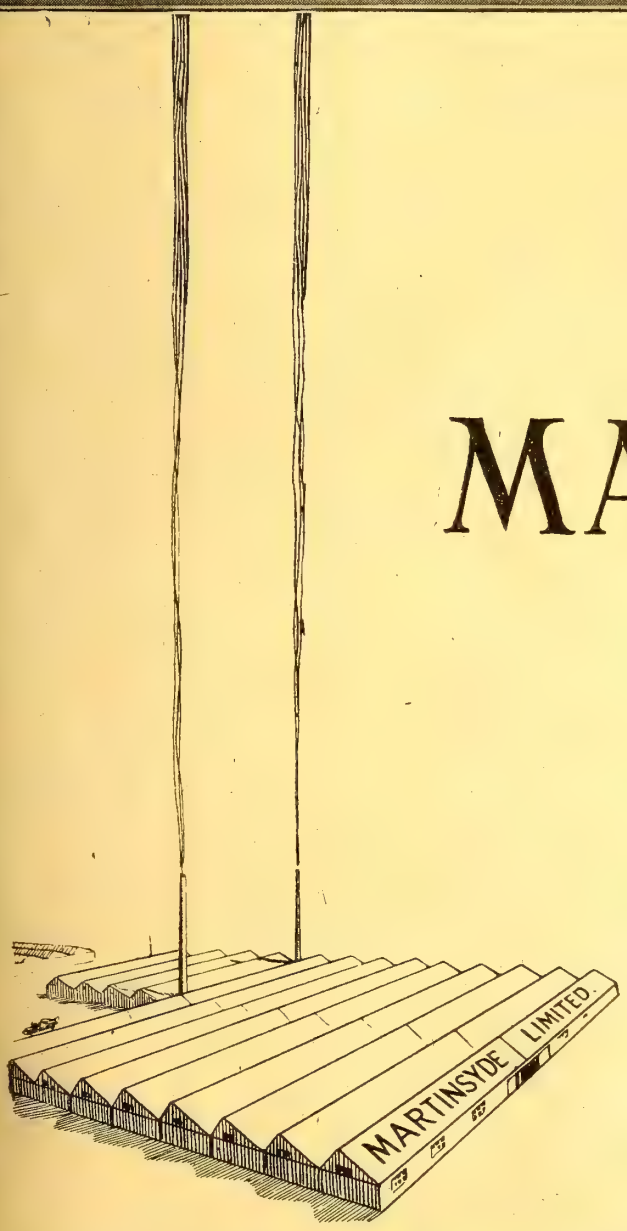
[This argument may be sound at the moment, but it by no means proves that it will be equally sound in time to come.]

Mr. Pringle moved an amendment to provide that no member of the Air Council should be financially interested in any undertaking supplying aeroplanes or aero-engines or parts to the



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Government. His arguments in the previous debate were reiterated. The amendment was seconded by **Mr. Harcourt.**

Mr. Bonar Law honoured this amendment by taking the trouble to give it his personal attention. His chief argument was that one has to bring businesss men into Government positions to get the special knowledge which they possess. After some argument he announced that the only man who would be affected by such an arrangement would be Sir William Weir. [One assumes that he is in error in this case, as one gathers that Mr. Percy Martin, of the Daimler Company, is also on the Air Board.] Mr. Bonar Law very correctly described Sir William Weir as the life and soul of the Supply Department of the Service, and said that if he were to leave his present post it would be a calamity to the Air Service. He pointed out that the then Director-General (Sir David Henderson) early in the war went to Glasgow, where he had personal connections, to try to get people as servants of the Government to undertake the work required to be done, and that Sir William Weir's firm undertook the work on a basis of cost plus 5 per cent., therefore this work was practically being done for nothing. [A false argument. A firm with 10,000 capital would make £500 every time it turned its capital over. If it did £200,000 worth of business in the year it would make £10,000, or 100 per cent. on its capital.]

Mr. Pringle asserted that his amendment was quite impersonal, and that he made no reflection whatever on Sir William Weir.

Mr. Bonar Law admitted that this was not a personal attack, but said that Sir William Weir looked upon this as something affecting his position, and his first feeling was that he would like to be done with Government contracts altogether. [Incidentally, Sir William Weir is by no means alone in this sentiment.] Mr. Bonar Law further suggested that these points were raised not always to maintain a principle, but sometimes to annoy the Government. **Mr. Harcourt, Mr. Billing,** and **Mr. Pringle** all objected to this remark.

Mr. Bonar Law, continuing, said he had explained the position to Sir William Weir, and had assured him that the Government would support him. Sir William Weir's reply was that he was not serving the Government, but had tried so far as he could to help his country. [An excellent reply.] It did not satisfy him that the Government supported him, and he wanted to be sure that the House of Commons was willing for him to go on. Mr. Bonar Law appealed to the House to show that in the case of all men who are giving their service in this kind of work they were not suspicious of them, but grateful to them for services rendered.

Mr. Ellis Griffith said that in this case they should frankly admit that they were abandoning a principle for the sake of securing the services of an individual, and they were all anxious to secure the continuation of his services. At the same time, they were legislating for the future as well as for the present, and considerations of war-time should not apply in peace.

Mr. Sherwell, Lord Hugh Cecil, and **Commander Wedgwood** supported Mr. Ellis Griffith's view.

Mr. Billing moved a further amendment that in the event of any conflict of opinion between the Admiralty and Army Council, or Army and Air Council concerning Air Service matters, the decision of the Air Council should prevail. The amendment was not seconded, and there was no debate on the point, which, incidentally, may be of considerable importance in time to come.

Mr. Harris moved an amendment that a second Secretary of the Air Council should not sit in the House of Commons, on the grounds that there were already too many Government officials in the House. **Mr. Macpherson** accepted the amendment on behalf of the Government.

There was some more argument, and finally the third reading of the Bill was passed.

THE AIR MINISTRY WRANGLE.

It is to be regretted that the important subject of appointing an Air Minister should have produced what amounts to a wrangle between various parties concerned. On November 16th most of the London papers contained a letter from Lord Northcliffe to Mr. Lloyd George. This letter reads as follows :—

Nov. 15th, 1917.

Dear Prime Minister,—I have given anxious consideration to your repeated invitation that I should take charge of the new Air Ministry. The reasons which have impelled me to decline that great honour and responsibility are in no way concerned with the office which is rightly to be set up. They are roughly as follows :—

Returning after five months spent in the virile atmosphere of the United States and Canada, I find that, while those two countries are proceeding with their war preparations with a fervour and enthusiasm little understood on this side of the Atlantic; while the United States has instantly put into operation Conscription, over which we wobbled for two years, and is making short work with sedition-mongers; while Canada has already given such proofs of thoroughness as the disfranchisement of conscientious objectors and the denaturalisation of all enemy aliens who have been naturalised in the last fifteen years; while we, for our part, are asking immense sacrifices from those peoples—there are still in office here those who dally with such urgent questions as that of the unity of war control, the eradication of sedition, the mobilisation of the whole man and woman power of the country, and the introduction of compulsory food rations.

I have had personal experience myself, while in America, of the obstruction and delay in certain Departments in London which, for example, postponed the sending of Lord Reading's vital and most successful Mission. I find that the Censorship is still being misused, and that men in various positions of authority, who should have been punished, have been retained and in some cases elevated.

The spirit of the men and women of Great Britain is clearly as eager and as splendid as ever. We have, in my belief, the most efficient Army in the world, led by one of the greatest generals, and I am well aware of the fine achievements of many others of our soldiers, sailors, and statesmen; but I feel that in present circumstances I can do better work if I maintain my independence and am not gagged by a loyalty that I do not feel towards the whole of your Administration.

I take this opportunity of thanking you and the War Cabinet for the handsome message of praise sent to me as representing the five hundred officials of the British War Mission in the United States, many of them volunteer exiles. Their achievements and those of their ten thousand assistants deserve to be better known by their countrymen. The fact that their work is not known is due to the absurd secrecy about the war which is still prevalent. Everything that these officials is doing is known to our American friends, and of course to the Germans.

I trust I make no breach of confidence in saying that some of the documents which have passed through my hands as Head of the Mission are such as if published would greatly increase our prestige in the United States and hearten our people at home.

May I also take this opportunity of giving a warning about our relations with that great people from whom I have come? We have had the tragedy of Russia, due partly to lack of Allied propaganda to counteract that of the Germans. We have had the tragedy of Italy, largely due to that same enemy propaganda. We have had the tragedies of Serbia, Rumania, and Montenegro.

There is one tragedy which I am sure we shall not have, and that is the tragedy of the United States. But, from countless conversations with leading Americans, I know that, unless there is swift improvement in our methods here, the United States will rightly take into its own hands the entire management of a great part of the war. It will not sacrifice its blood and treasure to incompetent handling of affairs in Europe.

In saying all this, which is very much on my mind, believe me that I have none but the most friendly feelings towards yourself, and that I am greatly honoured by your suggestion.

Yours sincerely,
NORTHCLIFFE.

The Right Hon. D. Lloyd George.
British War Mission to the United States of America. London Office: 29, Abingdon Street, Westminster, S.W.1.

So far as his refusal of the post of Air Minister is concerned, Lord Northcliffe has conferred on British aviation another of those great benefits which we are accustomed to receiving at his hands.

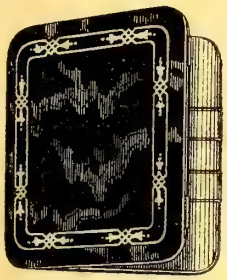
Nevertheless, one fails to follow entirely his reasons for refusing. It would seem that if things in this country are in such a state of mess and muddle, when compared with the United States and Canada, as Lord Northcliffe appears to believe, a great opportunity is offered him of putting them right.

It may be, however, that Lord Northcliffe is not contented with the prospect of devoting his energies to the setting right of the Flying Services alone, but that he has the greater ambition of becoming Prime Minister himself, so that he may deal faithfully with all the subjects to which he refers in his letter, in which case,

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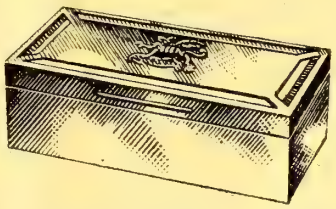
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the greater including the less, he would then proceed to reform all the Services and their appendages, including the New Air Force, irrespective of who might be Air Minister.

Though the bulk of his letter is not relevant to the Flying Services, one cannot refrain from suggesting that quite possibly Lord Northcliffe may have mistaken trans-Atlantic hustle for pure productive efficiency. The two things are not the same, and he may have failed to assimilate the salient facts differentiating them. With full knowledge of America's vast capabilities, one must recognise that much of this wonderful hustle is of the kind pertaining to the American who does a quick-lunch stunt in ten minutes and spends an hour and a half telling his friends how much time he has saved over it. Quite possibly the ordinary Englishman who takes an hour and a half over his lunch does just as good a day's work—and avoids indigestion, which is another word for malassimilation.

Moreover, England can say, like the small heroine in the story of the children's play, "I, too, have not been idle in your absence." Despite Lord Northcliffe's absence for so many months, considerable progress has been made in all branches of production. Under Mr. Churchill, the Ministry of Munitions has done wonders in all directions, and that particular portion of it which is under Sir William Weir has, perhaps, done best of all, considering the chaos into which he stepped on taking office.

If America and Canada have done such marvellous things, as suggested by Lord Northcliffe, it is well to remember that they have had the immense advantage of starting at the point which we have reached. They have all our mistakes laid out in front of them, so that they can be avoided. They have all our dearly bought experience at their disposal. They can use all our technical knowledge. And they have no mass of accumulated errors in organisation to clear away before they begin on the right lines. If, with all those advantages at the start, they cannot do better than we did in the same time, they will have little enough about which to feel pleased.

The Broken Puppet.

Lord Northcliffe's confession of absence of loyalty to the administration of the Prime Minister whom he himself set up is of considerable interest, and his future activities in relation to Mr. George will, at any rate, be entertaining. Most people are, at any rate, in sympathy with the sentiment, implicit in Lord Northcliffe's letter, that Mr. George is not the type of man which one would choose to lead the British Empire in time of peril.

I submit again, after a lapse of some three years, that what this country needs is a military dictator, a Cromwell who would be at once Protector of his King and of his Country. Lord Kitchener could have been that man, but he lost his chance. Somewhere surely in the British Army is another as great as Cromwell. If he did no more than clear away the babbling mob of politicians who defile our seats of Government, he would have justified his existence.

Meantime we are not doing so badly as Lord Northcliffe's letter suggests, and in aeronautical affairs we are doing far better than we deserve.

Lord Cowdray's Resignation.

Much of the credit for our aeronautical progress is due to Lord Cowdray, so one is not surprised, after the affront put upon him by Mr. George in offering the Air Ministry to Lord Northcliffe over his head, to learn that he has definitely and peremptorily resigned. His resignation is contained in a dignified letter which was published on November 17th, and reads as follows:—

16, Carlton House Terrace, S.W.,
Nov. 16th, 1917.

Dear Prime Minister,—It ought not to have been left to me to receive from Lord Northcliffe's lettter to the "Times" the first intimation that you desire a change at the Air Ministry, and I think in consequence you cannot be surprised to receive my resignation. I hope it will be accepted with as little delay as possible so that the work of the Department may not unduly suffer during the transfer of my duties to my successor.

When you honoured me in January last by requesting that I should take up the position which I am now resigning, you explained that it was intended that the status of the new Air Ministry then to be formed would be equal to that of the Board of Admiralty and the War Office; that I should find difficulties in co-ordinating the Royal Flying Corps and the Royal Naval Air Service; that the problem of increasing the supply of aircraft demanded immediate attention; and that it was left to me to report to the Cabinet what the definite duties and responsibilities of the new Ministry should be.

After full consideration of the situation I was able, within four weeks of my appointment, to submit for the approval of the Cabinet the terms of a Charter agreed upon by the Navy and the Army and the Ministry of Munitions. I had come to the conclusion that the best course to follow in creating an Air Ministry with full control of the Air Forces was to proceed by stages, the first stage being represented by the Charter, whilst the final stage is represented by the Air Force Bill now being discussed by the House of Commons. When this Bill becomes operative the nation will possess an Air Service with full powers—the desideratum expected, and in fact demanded, by the country.

As for the material results of the year, the devoted work of my colleagues and staff of the Air Board together with the loyal co-operation of the Departments concerned have enabled the effective Air Forces of the Army to be increased threefold.

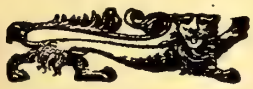
Yours sincerely,
(Signed) Cowdray.

Mr. George thoroughly deserved such a letter, which can only be described as a rap over the knuckles. His excuse will doubtless be that he was under the impression that Lord Cowdray intended to resign anyhow, seeing that he had already tendered his resignation some time ago, because of his health. Even so, Mr. George would have done well to have made sure of Lord Cowdray's intentions before offering his post to someone else. Still, perhaps it would be too much to expect the correctness of action of a Salisbury or of a Chesterfield from a Carnarvon lawyer. There is a proverb concerning impossible material from which to make silken purses.

Doubtless in due course we shall be afflicted with Mr. George's views on the subject.

So far as Lord Cowdray is concerned, all will regret his resignation. If not the first Air Minister according to Act of Parliament, he has been the first Air Minister in fact. His graceful tribute to the work of his colleagues and staff at the Air Board is well deserved by them, but one and all to whom this tribute has been paid will acknowledge how much they owe their success, and the liberty of action which has made possible that success, to the quietly masterful way in which Lord Cowdray has overcome obstructions and has insisted on things being done.

If we were not at war, the spectacle of a petty parliamentarian like Mr. George—a mere Welsh revivalist amongst politicians—presuming thus to slight a great organiser and controller of men like Lord Cowdray would be comic. Personally Lord Cowdray could afford to overlook the slight, but as President of the Air Board the dignity of his office and his loyalty to his colleagues would make such action impossible. Therefore he has obviously done the right thing in resigning. The enormous size of the Flying Services to-day bears witness to his work. Aeroplanes are more common in the sky now than are cars on the road. Of Lord Cowdray one may say, *Si monumentum requiris, circumspice*—that is to say, on any reasonably fine day.—C. G. G.





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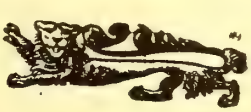
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THE CURTISS CORRUPTION CHARGE.

At the Central Criminal Court, on Nov. 19th, before Mr. Justice McCardie, Mr. William Augustus Casson, 63, barrister, on bail, pleaded "Guilty" to twelve counts of an indictment charging him with giving a gift to John Cyril Porte, an agent of the Crown, as an inducement for showing favour to the Curtiss Aeroplane Company in relation to the business of the Crown. Mr. Casson pleaded " Not Guilty " to counts charging him with conspiracy to defeat the law, and with aiding John Cyril Porte to accept gifts.

Mr. Justice McCardie fined Mr. Casson £500 on each of the twelve counts, making a total of £6,000, and also directed him to pay the costs of the prosecution.

The Attorney-General, Sir F. E. Smith, at once announced that in the case of Commander Porte he wished to enter a *nolle prosequi*. He said that Wing. Comdr. Porte was for a time in the submarine branch of the Royal Navy, but was invalided out of the service in 1911. He appeared to have acquired considerable knowledge of aeronautics, and went to America about a scheme for flying seaplanes across the Atlantic. Comdr. Porte's services before he resumed his commission in the Navy were given to the Curtiss Aeroplane Company, and were rewarded by an agreement under which he was to receive from 20 to 25 per cent. on the sale of all flying boats for which he obtained orders. Mr. Casson was aware of this agreement, and when Porte resumed his commission he arranged with Porte as to the receiving of Porte's commissions on boats sold to the Admiralty. The arrangement was that all the profits made were to be received by Casson, who would retain one-quarter for himself and pay over the remainder to Porte. In these circumstances matters proceeded, and very large orders were given by the Admiralty to the Curtiss Company.

The Attorney-General then explained his reasons for withdrawing the case against Comdr. Porte. At the outbreak of the war Comdr. Porte was in America occupying a commercial position in the aeronautic world which was a very advantageous one. Immediately on the outbreak of the war he abandoned that position, came to England, and placed his services unreservedly at the disposal of his country. At that time and now he was suffering from a most grave hæmorrhage of the lung. At the present Comdr. Porte was doing invaluable work at the Admiralty in regard to the national defence, and the Admiralty were most anxious to retain his services. The progress of the malady from which he suffered was such that it was not possible to suppose that in any event the period for which his services would be at the disposal of his country would be a very protracted one. All the money paid to Comdr. Porte, with the exception of £10,000, which had been disposed of, remained in his possession, and the balance would be handed over by his representatives to the authorities. When Mr. Casson's house was searched by the police they found securities for the commissions paid him to the value of £16,000, and these were now in the possession of the authorities.

Mr. Hume-Williams, K.C., said that it would be universally felt that the course taken by the Crown would remove any possible stigma from the name and reputation of a very useful and distinguished public servant. Commander Porte was a very distinguished inventor. Before the war broke out he had entered into a contract with the Curtiss Company in New York that a certain sum should be paid to him as royalties on the future sale of boats of which he was the inventor. If the war had not broken out that would have produced very considerable and gratifying results. On the outbreak of the war Commander Porte forsook all his commercial advantages and gave up his distinguished position in New York. So anxious was he to offer his services to his own land that he left New York with nothing but his clothes, and came to England. He was then in a condition of health which would have justified any man in excusing himself from taking part in the defence of his country. Since that time he had occupied a very responsible position. From the moment he entered the Admiralty he had no more concern with the commercial interests which he left behind him. Then came the inquiry, and it was pointed out to him that the amounts that were automatically passing into the hands of Casson under the pre-war contract technically represented sums to which he was not entitled. He at once consented that any amount which was still in his hands should be repaid to the authorities, to deal with as they thought fit. He (Mr. Hume-Williams) thought it was a matter for congratulation, not only to Commander Porte, but to the whole country, that the attitude which the Crown had taken up would enable him to return to render once more to the country services which the Admiralty themselves recognised to be invaluable.

Mr. Patrick Hastings, addressing the Judge on behalf of Mr. Casson, said that to a very large extent the facts of the case would seem to show that the main object of Mr. Casson was to protect what he believed to be the proper interests of his friend, Commander Porte. If the case stood there, no one would have advised Mr. Casson to plead guilty to the counts, but unfortunately he allowed affairs to develop so that he obtained for himself a proportion, though only a small proportion, of the money which passed. Mr. Casson was a man who for 40 years or more had had a career of the utmost distinction and honour in the public service. The only reason he left the public service was ill-health. He was now, unfortunately, paralysed in one of his hands. For 20 years he had been a member of the Bar.

Mr. Justice McCardie, addressing Mr. Casson, said the crime of pecuniary corruption was a gravely insidious one. It polluted the individual and sapped the righteousness of the State. He grieved most deeply that his office of Judge called upon him to deal with a case in which a brother barrister was arraigned before him. Happily, the case was not in any way associated with any professional duty.

The Attorney-General said the Crown was satisfied that Mr. Casson had no resources to enable him to discharge the large amount of the fine, but Mr. Casson was willing that the £6,000 should be paid out of the moneys which the police held, and he was also desirous that the balance of those moneys should be restored to the authorities.

Mr. Justice McCardie said the whole of the money would be given back to the Crown.

A Personal Comment.

This strikes one as being one of the most amazing arrangements ever made to terminate a criminal prosecution. To the ordinary man it would appear that a man must be either guilty or not guilty, one has never heard of a burglar being condemned to restore his loot, and having the privilege of paying a fine and costs out of the proceeds.

However, setting all law on one side, the facts seem to be that Commander Porte, as a retired Naval Officer, and, therefore, a civilian for the time being, acquired, while in America, as a reward for making the Curtiss boat a sound proposition, a certain definite proprietorial interest in that boat, which was expressed as a percentage on the sales. That interest was as much personal property as if he had acquired a plot of land which afterwards appreciated in value owing to the Admiralty needing it for a dockyard or a munition factory.

It was through no action of his that the percentage on the Curtiss boats ran into tens of thousands instead of a few hundreds; in fact, it was rather the other way, for it will be remembered that in evidence at an early hearing of the case important witness stated that Commander Porte had recommended that the boats should be built in England, a piece of advice directly opposed to his own interests.

However, on arriving in England after the outbreak of war, Commander Porte—or Lieut. Porte, R.N. (retired), as he then was—made over his property to his legal adviser, and offered his services to his country. There was no obligation on him to do so, for he had been invalided out of the Service, and he would have been fully justified in settling down to work as a perfectly good munition profiteer running a flying-boat factory of his own, and drawing commission on Curtiss aeroplanes as a side-line. By doing so he would have made hundreds of thousands of pounds, instead of finding himself unexpectedly in possession of a few thousands. As it was, he entered the R.N.A.S. as a Squadron-Commander, and did splendid work in training new pilots at Hendon.

In this capacity the R.N.A.S. has to thank him for many of its best and most distinguished pilots. Thereafter, he took over a seaplane station, trained seaplane pilots, organised seaplane patrols, destroyed numerous submarines, experimented, designed, developed, re-designed, and finally produced the finest big flying boat the world has seen. When challenged in Parliament to name any official or officer of the R.N.A.S. who had ever designed an aeroplane which was of use on active service, Commander Porte's was the only name which the Admiralty representative could mention. And all this in spite of being in a state of health such as would have caused any ordinary man to become a chronic invalid.

If any man ever deserved the thanks of an ungrateful country that man is John Porte, still, happily, Wing Commander, R.N. He is not likely to get such thanks, but it will probably suffice to him that he retains unaltered the personal esteem of all who have served with him, and the confidence of all his subordinates.

The Others in the Case.

As to Mr. Casson, those who know him best still hold that he is a loyal friend who has done many kind actions without hope of personal profit, and that though possibly in this case he misinterpreted the law of the land, no moral blame attaches to him. Personally, I know Mr. Casson very slightly, so merely record the fact that those who were his friends before this unfortunate case are if anything more his friends than ever. There is something utterly pathetic in the spectacle of an old and honoured servant of the State thus suffering for a mistake committed in all good will to help a friend, and very general sympathy is felt with him in his trouble. It is fairly obvious that he only pleaded "Guilty" because he is too old and tired, and not sufficiently wealthy, to fight a long and complicated case against the legal forces of the Crown, for it is

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quite evident that he could not hand over money which was already Comdr. Porte's property—whether he liked it or not—"as an inducement for showing favour to the Curtiss Aeroplane Co." In a strictly technically legal sense the charges may be good, but law is not often common sense.

So far as Mr. Lyman Seely is concerned, he has not been tried, so presumably it would be contempt of court to refer to the legal aspect of his case. One may, however, say that he is a capable American business man, a sportsman who has more than once gambled all his worldly possessions on the success of aviation, and that he "struck oil" over the Curtiss deal to an extent which at least recouped him for his previous losses and left a profit. He is not the man to go back on a friend and his friends are not likely to go back on him. If Mr. Seely cared to come over to this country to fight the case, and could bring Mr. Glenn Curtiss as chief witness, it is probable that he would put quite a different complexion on it.

Private Animosity.

Finally, one may say that it is common talk in the R.N.A.S. that the case would never have been brought to light at all but for an intrigue, growing out of a purely personal quarrel, by which it was hoped that quite another person than Comdr. Porte would be implicated. That other person has, fortunately, come through unscathed, and Comdr. Porte may be considered, along with Messrs. Casson and Seely, as more or less the victims of a vendetta in which they were not concerned.

It seems, therefore, as if the law officers of the Crown rather regretted having brought the charges, and were content to divert into the Exchequer the money paid by the Curtiss Co., according to its legal obligations, instead of pushing the case to its logical conclusion. In other words, it seems as if, having been persuaded to bring a bribery charge, the State has accepted a bribe to stop proceedings. It is only to be regretted that this outburst of energy in the search for purity in national finance has not extended a great deal higher and lower than those concerned in the present case.

It is noteworthy that at no time in the case has it ever been suggested that the Curtiss Co. itself was guilty of any corrupt practice.—C. G. G.

GERMANY'S AIR CHIEF.

A Press correspondent with the French Armies writes:—

When the battle of the Somme had spent itself in the mud and mist a year ago, the Germans realising how narrowly they had escaped decisive defeat, held a careful inquiry into the causes of their unexpected weakness. The explanation that came from the Staffs of the armies on the Somme was that the main reason for the superiority of the Allies was the hopeless inferiority of the German air service.

The British and French guns were guided; the German guns were not. The rest followed logically. From the moment when this fact was recognised, dates the great German effort to recover the ascendency in the air.

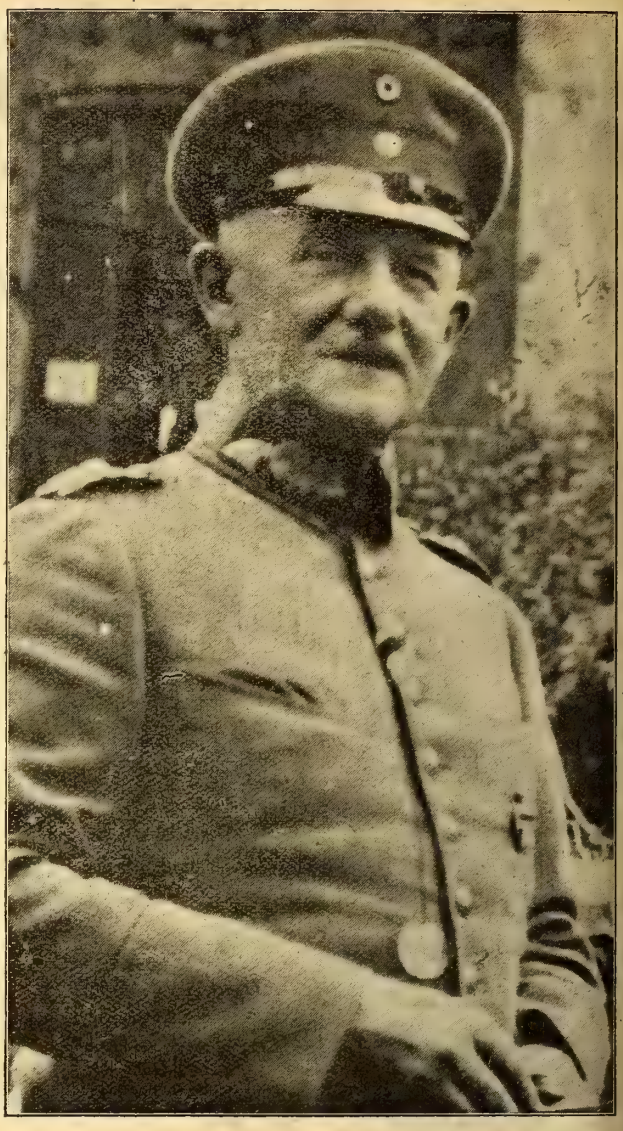
In November last the whole air power of the German Army was united under the command of a single chief, General von Hoeppner, a cavalryman, young for his rank, who had served through the Somme battle as Chief of Staff of General von Below's Army. General von Hoeppner left the Somme fully convinced that the Allies owed their success to their superiority in the air, and he set to work instantly to redress the balance. It is to the energy and inventiveness of this officer that the Germans owe the recovery of their air service that we have witnessed this year. We have to thank him for the Gothas, for the bombing raids over England and behind the front in France, for the constant appearance of new types of machines and new methods of attack.

General von Hoeppner has full powers and the full support of his military chiefs and of the Kaiser. The construction, as well as the strategical and tactical employmentt of the German air squadrons are under his absolute control. Under the Kaiser he is "Dictator" of the air, and, as he has the needful force of will, as well as the authority, to carry through sweeping changes, we need not wonder if a new life seems to have been infused into the German air service since the battle of the Somme. The former head of the air service in the zone of the armies, Colonel Thomsen, is his chief assistant and adviser.

General von Hoeppner's first business on assuming his post was to start a campaign in the army and in the country in support of the air service.

Under von Hoeppner it soon became known that efficient airmen received prompt reward and recognition, and enjoyed all kinds of favours from their chiefs. The Press was fed with suitable articles, interesting accounts of the feats of German airmen, etc., and an air war exhibition was held in Berlin. Young officers of other arms were encouraged to become airmen. The results of all this advertising were highly satisfactory. There is now a positive rush of suitable candidates for the Air Service.

Similar efforts have been made to improve and multiply the flying material of the Army. A fighting machine was wanted that could meet the French Nieuports and Spad aeroplanes on equal terms. All the aeroplane factories were set to work at high pressure to produce it. Wherever a factory could be found



General von Hoeppner—Chief of the German Air Service.

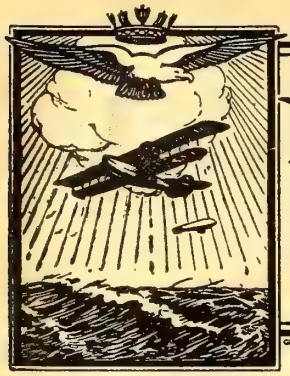
with suitable plant not already making aeroplanes or aeroplane parts, General von Hoeppner pressed it into his service. To increase the output of the factories, types, both of aeroplanes and engines, were, as far as possible, standardised, and product was concentrated on the four types selected—the Albatros fighting machines, the Albatros observation two-seater, and the Deutsche Flugwerke and General Electrical Company (A.E.G.) models. Similarly, attention was centred on the production of Benz and Mercédès motors, at first 160 horse-power, and later of 200 and 260 horse-power, to the neglect of other makes, with the result that these motors can now be turned out at a much greater rate than before.

Having ensured an adequate supply of these machines and engines, the best then procurable, General von Hoeppner has shown perfect readiness to accept improvements in air material wherever they appear. He is the chief promoter of the Gotha machine, for which he has placed large orders with the Erfurt factory that builds them. Lately he has been supplying the battle squadrons with a large number of aeroplanes carrying two machine-guns, and the observation machines have been improved in speed and armament.

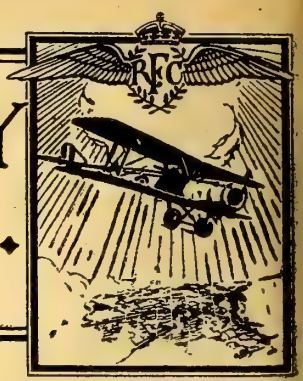
The true test of an air squadron's efficiency, writes an expert, is the number of hours of flight its machines can perform during the stress of a long battle. Of two opposed squadrons the winner will be the one that can wear down the other, which means the one that can most often take the air. That depends on the capacities of the aerodromes behind the front.

General von Hoeppner has done his utmost to bring his aerodromes up to the highest state of efficiency. The personnel is abundant. Each flight of six aeroplanes has in its service a complement of from 100 to 120 men. To each machine there are four mechanics, and every squadron has its own train of motor transport, motor-cars, etc. The aerodromes are protected as well as possible from air attack by anti-aircraft guns, of which the Air Service has no fewer than 600, including a large number of 4-in. pieces.


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FROM THE "LONDON GAZETTE."

Admiralty, Nov. 7th.

R.N.A.S.—Temp. Flt. Sub-Lt. to be temp. Flt. Lt. (specially for meritorious war service):—E. T. Hayne, Nov. 7th.

Nov. 10th.—Temp. Flt. Sub-Lts. to be temp. Flt. Lts.:—P. Johnson, Nov. 6th. M. B. Walker, Nov. 8th. A. N. Robinson, Nov. 9th.

Admiralty, November 9th.

Nov. 13th.—R.N.A.S.—To be temp. Flt. Comdr.:—E. Willis, Nov. 7th.

Nov. 14th.—Flt. Lt. R. H. Collet, who relinquishes his commission on account of ill-health, to retain his rank, Oct. 29th.

War Office, Nov. 13th.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing.—Flt. Comdrs.—From Flying Officers, and to be temp. Capts. whilst so empld.; Temp. Sec. Lt. N. H. Dimmock, Gen. List, Oct. 27th. Lt. T. S. Malcomson, R.F.A., T.F.; Sec. Lt. (temp. Lt.) H. A. Smith, Midd'x R., T.F.; Temp. Lt. H. S. Robertson, Gen. List, Oct. 31st.

Equipment Officers, 1st Cl.—From the 2nd Cl., and to be temp. Capts. whilst so empld.:—Sec. Lt. (temp. Lt.) H. R. Mosenthal, Spec. Res., Oct. 17th. Temp. Lt. J. A. Stone, Gen. List, Nov. 1st.

Schools of Instruction.—School of Mil. Aeronautics.—Comdt. (Graded as a Wing Comdr.).—The appointment of Maj. (temp. Lt.-Col.) I. M. Bonham-Carter, North'd Fus., notified in "Gazette" of Sept. 19th, is ante-dated to Sept. 28th, 1916, but without pay or allowances prior to July 6th.

Gen. List.—The following, from R.F.C., to be temp. Sec. Lts.:—Flt. Sjt. P. G. Edmonds, Sjt.-Maj. W. J. Bramley, Sjt. J. A. H. Hood, Cpl. D. L. Stewart, Oct. 16th.

* * *

The following reference to the work of the R.F.C. in connection with the operations in Palestine between Oct. 24th and Nov. 8th, is contained in a telegraphic summary received from General Allenby, K.C.B.

Throughout these operations the Flying Corps has done excellent work, has established complete mastery in the air, and harassed with machine-guns and bombs the retreating columns.

War Office, Nov. 14th.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing.—Sqdn. Comdr.—Temp. Capt. J. B. Quested, M.C., Gen. List, from a Flt. Comdr., and to be temp. Maj. whilst so empld., Oct. 27th.

Park Comdrs.—And to be temp. Majs. whilst so empld.:—Lt. (temp. Capt.) E. M. L. Ainslie, Middx. R., T.F., from a Flt. Comdr.; Sec. Lt. (temp. Capt.) J. Kemper, S. Lan. R., from an Equipment Officer, 1st Cl., Nov. 15th.

War Office, Nov. 15th.

REGULAR FORCES.—Staff.—Special Appointments.—Graded for pay as a Staff Capt. whilst commanding a Squadron, R.F.C. Cadet Wing.—Lt. A. C. Carter, Welsh R., T.F., and to be temp. Capt. whilst so empld., Oct. 8th, 1917.

The following temp. appointments are made at the War Office: Staff Lts.—Temp. Lt. J. E. Pike, Gen. List, from a Flying Officer, vice Lt. (temp. Capt.) D. C. James, Worc. R., Spec. Res., Aug. 31st.

Establishments.—R.F.C.—Mil. Wing.—Staff Officers, 2nd. Cl.—(Graded for purposes of pay as a Brig.-Maj.):—Lt. (temp. Capt.) C. E. Wardle, R.F.C., Spec. Res., from a Flt. Comdr., and to retain his temp. rank whilst so empld., Oct. 18th. 3rd Cl.—(Graded as a Staff Capt.):—Capt. G. Disney, Essex R., and to remain secd., Sept. 13th.

Equipment Officer, 1st Cl.—Temp. Lt. H. A. Whelen, Gen. List, from the 2nd Cl., and to be temp. Capt. whilst so empld., Oct. 15th.

War Office, Nov. 16th.

REGULAR FORCES. — Staff. — Special Appointments.—Graded for purposes of pay as a Brig. Maj. while empld. as 2nd in Comd. of Officers' Technical Training Corps, R.F.C.—Temp. Sec. Lt. (temp. Maj.) E. J. Parker, Gen. List, Aug. 20th.

Establishments.—R.F.C.—Mil. Wing.—Officer in Charge of Records.—Bt. Lt.-Col. W. E. S. Burch, ref. pay, and to be temp. Col. whilst so empld., August 2nd.

Staff Officers, R.F.C., 2nd Cl.—Graded as a Brig.-Maj.—Temp. Capt. W. B. Adams, Gen. List, from the 3rd Cl., graded as a Staff Capt., Oct. 25th.

3rd Cl.—Graded as Staff Capts.—Capt. R. B. C. M. T. de Poix, Norf. R., T.F., from an Adjt., R.F.C., Oct. 25th. Temp. Lt. (temp. Capt.) C. C. Treatt, N. Lan. R., from an Adjt., School of Mil. Aeronautics, and to retain his temp. rank whilst so empld., Oct. 28th. Temp. Capt. E. N. E. Waldron, Gen. List, from an Adjt., R.F.C., Nov. 1st.

Group-Comdr.—Capt. (temp. Lt.-Col.) U. J. D. Bourke, Oxf. and Bucks L.I., from a Wing Comdr., and to be temp. Col. whilst so empld., Nov. 1st.

Sqdn. Comdrs.—From Flt. Comdrs.—Maj. S. Hutcheson, Ind. Inf., May 12th. Lt. (temp. Capt.) D. Joy, Spec. Res., and to be temp. Maj. whilst so empld., Sept. 18th. Lt. (temp. Maj.) G. S. M. Ashby, R.A., from a Chief Instr. (graded as a Sqdn. Comdr.), School of Mil. Aeronautics, and to retain his temp. rank whilst so empld., Sept. 22nd.

Flt. Comdrs.—From Flying Officers, and to be temp. Capts. whilst so empld.—Temp. Lt. H. H. W. Bean, Gen. List, Oct. 27th. Lt. A. R. E. Henley, R. Scots, T.F., Oct. 31st. Sec. Lt. (temp. Lt.) R. Reeder, Manch R., T.F., Nov. 1st. Temp. Sec. Lts. T. C. Thomson, Gen. List; R. C. Davies, Gen. List; and E. P. Wilmot, M.C., Gen. List; Sec. Lt. A. H. Dalton, Hrs., Nov. 2nd.

Group Instr. in Gunnery.—Graded as a Flt. Comdr.—Lt. (temp. Capt.) M. D. G. Scott, N. Lan. R., Spec. Res., from a Flt. Comdr., Nov. 1st.

Equipmt. Officers, 1st Cl.—From the 2nd Cl., and to be temp. Capts. whilst so empld.:—Lt. C. St. Noble, Spec. Res., Lt. H. L. Saunders, Spec. Res., Lt. W. H. Smith, Spec. Res., Oct. 25th. Temp. Lt. R. Cadman, Gen. List, Sec. Lt. (temp. Lt.) C. A. Cuthbert, Spec. Res., Nov. 1st.

Gen. List.—To be temp. Sec. Lts.:—1st Cl. Air Mech. D. P. Cameron, from R.F.C., August 26th. Qr.-Mr.-Serjt. P. Geach, from R.F.C., Sept. 23rd. Temp. Serjt.-Maj. M. B. Fitzgerald, from the R.F.C., Oct. 18th.

Memorandum.—Officers holding temp. commissions, who have been transferred from regts. or Corps to the Gen. List, for duty with R.F.C., are now transferred to Gen. List R.F.C., retaining their present seny.

TERRITORIAL FORCE.—Infantry.—R. War. R.—Lt. G. B. Birch to be Capt., prec. June 1st, 1916, next below Capt. R. H. M. S. Saundby, M.C., June 29th.

Admiralty, Nov. 17th.

The King has been pleased to approve of the award of the following decoration awarded for services in action with enemy submarines:—

Distinguished Service Cross.

Flt. Sub-Lt. C. S. Mossop, R.N.A.S.

* * *

The following Officer is mentioned in dispatches for services in action with enemy submarines:—

Flt.-Comdr. J. S. F. Morrison, R.N.A.S.

* * *

The King has been pleased to approve of the award of the following honours, decorations, and medals to Officers and men of the Royal Naval Air Service:—

Distinguished Service Order.

Act. Flt. Comdr. R. Graham, D.S.C., R.N.A.S.

For conspicuous gallantry and devotion to duty in air flights and bombing raids. Since the award of a bar to the Distinguished Service Cross, Act. Flt. Comdr. Graham has carried out five night bombing raids, and attacked and brought down three enemy seaplanes. On one occasion he ascended at night for the purpose of attacking hostile machines, not-

(*Continued on page* 1528.)

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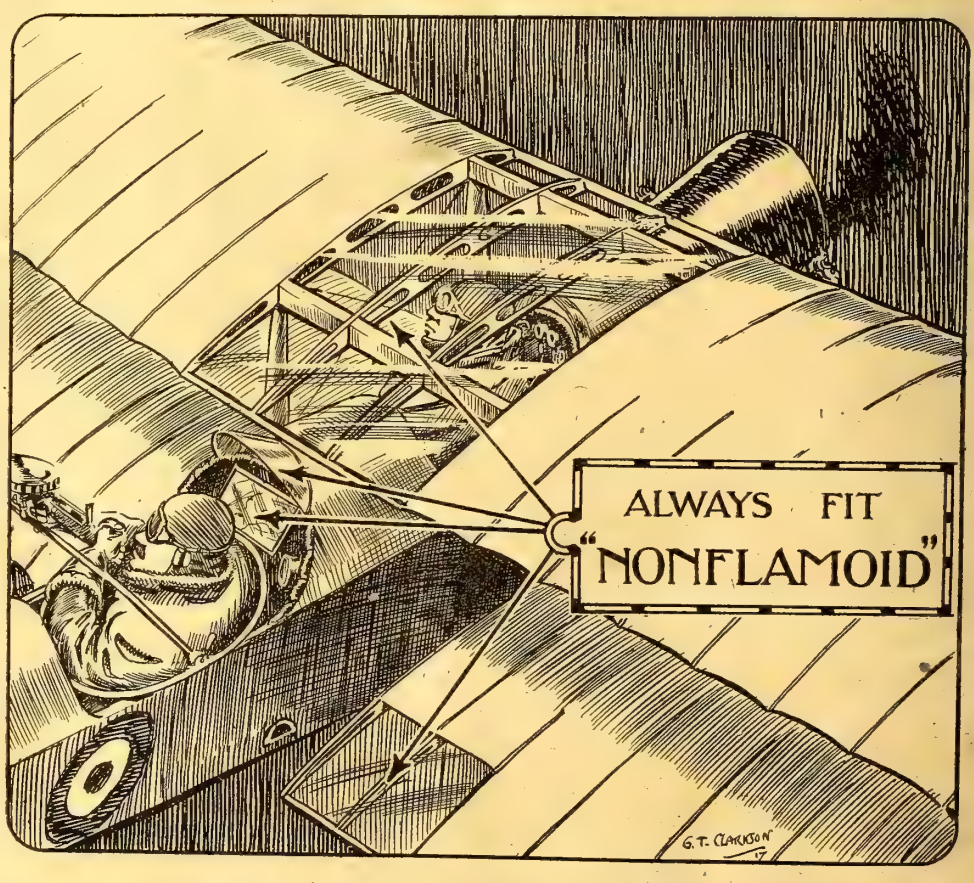
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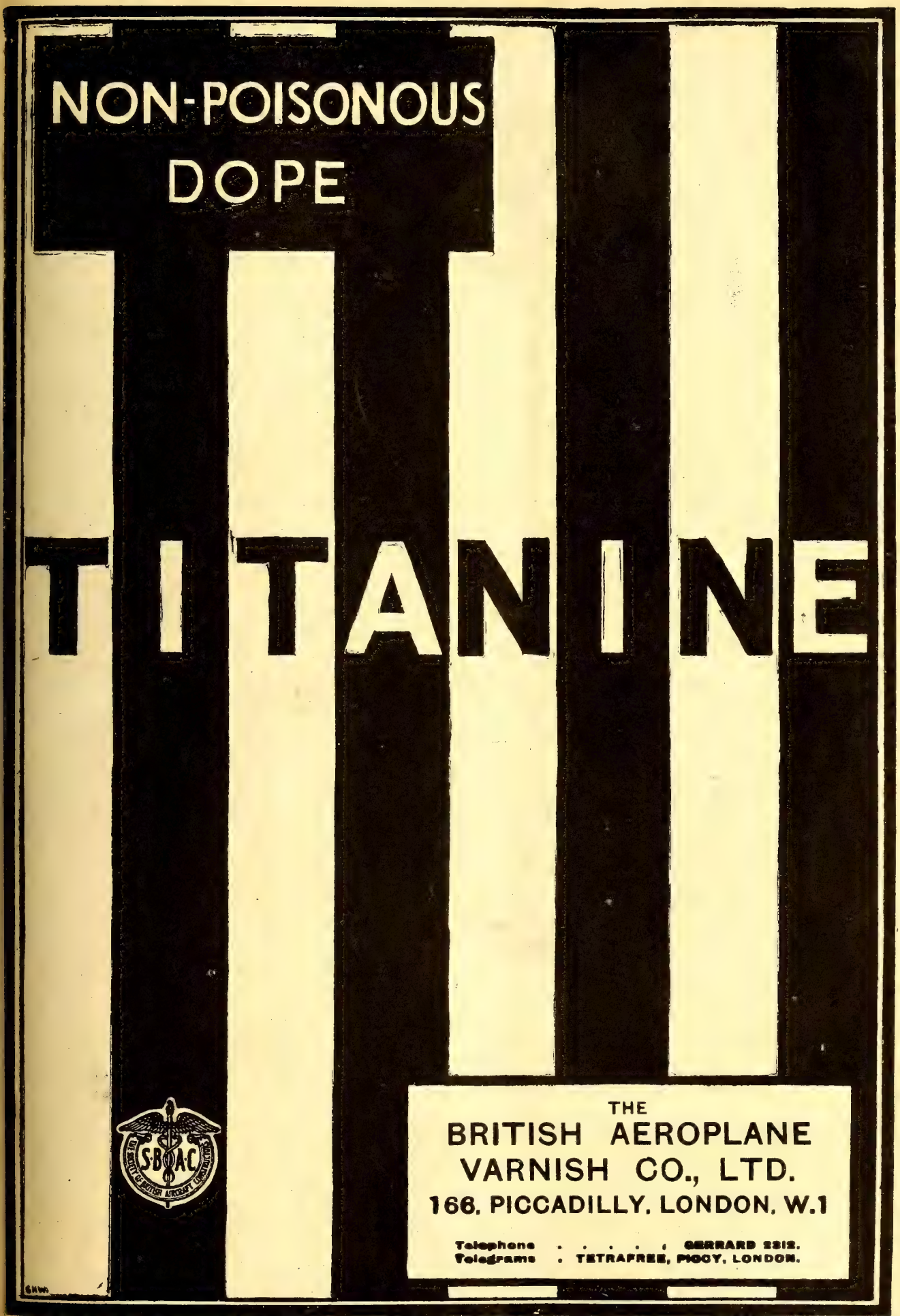


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The Opening of the Aeronautical Lecture Season.

The first meeting of the 1917-1918 lecture season of the Aeronautical Society of Great Britain took place on November 14th in the theatre of the Institution of Civil Engineres. The chair was taken by Lt. Col. Mervyn O'Gorman, C.B., of the Aircraft Manufacturing Co., Ltd. The opening lecture was delivered by Capt. F. M. Green, late of the Royal Aircraft Factory, now Territorial Force Reserve. Capt. Green's subject was announced as "The Technical History of the Aeroplane," and the following excerpts give a general idea of the tenor of his remarks. It may be well to make it clear that many of the statements laid down by the lecturer represent personal opinions rather than ascertained facts. The elementary nature of the lecture makes it eminently suitable for young aircraft workers.

THE LECTURE.

The history and development of mechanical flight may be confined almost entirely to the present century. In the last century some success had been achieved in gliding flight, model aeroplanes had been made and flown, and at least two man-carrying aeroplanes had actually left the ground, but it was not until the year 1903 that the Wright Bros., having ended a painstaking research in gliding flight, earned for themselves the honour of being the first men to fly.

Directly the success of the Wright Bros. became known, or rather when people began to believe that what the Wright Bros. claimed was actually true, the development of flying became rapid in the extreme.

Directly mechanical flight was possible, full scale experiments were carried out, often at the risk of the life of the experimenter, and the more obvious problems became apparent. In the short space of 14 years our scientific knowledge of aeronautics compares very favourably with the world-old science of navigation of the sea.

It is the intention of this paper to discuss the progress that has been made in dynamic flight and to consider the chief factors that have made this progress possible. An attempt will be made to state in a general way the standard of development as it exists to-day, and to consider the possible direction of progress in the future.

Definition.

The flying machine is an apparatus in which an arrangement of surfaces is moved in such a way that the reaction of the air provides a vertical component of the force on the surfaces equal to the weight of the apparatus. An aeroplane, as we know it, has its supporting surfaces fixed relative to itself and is driven forward by the reaction of one or more airscrews.

Besides an aeroplane, two other sorts of flying machines have offered possibilities to the inventor. One is known as the Helicopter, in which the lifting surfaces are revolved in a horizontal plane. The second is called an Ornithopter, and in this the supporting surfaces are moved in a way to imitate a bird flapping its wings. Although both these types are conceivably possible, their usefulness and practicability appear doubtful and it is only proposed in this paper to consider the aeroplane as we know it.

Aeroplane Performance.

Nowadays we make careful measurements of the characteristics of each new aeroplane at various heights, and the word "performance" is used to refer to the speed, rate of climb, and load carried. A good performance is one of the important essentials of usefulness of an aeroplane, and we will now consider the factors that have enabled us to improve so much on the early aeroplanes.

There are four main factors that govern the performance of an aeroplane, they are:—I. The wing surface that supports the weight. II. The total weight supported in flight. III. The resistance of the aeroplane to forward motion. IV. The thrust available from the airscrew or airscrews.

These factors are very intimately connected, and each in turn will be considered, its effects discussed, and the possibility of improvement outlined.

Supporting Surface.

As to the wings, it is necessary to know how to express the value of any particular arrangement of surfaces. The result at which to aim is to obtain the maximum vertical reaction or lift for the minimum horizontal reaction or drag. The term lift-drag ratio is, therefore, a measure of the effectiveness of a plane. Another attribute is, however, desirable, viz., that the lift per square foot of plane shall be high, so that as little surface as possible need be used for a given minimum speed of flight.

Planes vary in curve, plan form, and arrangement and number of surfaces. The designer will vary these factors according to the sort of aeroplane he wishes to make.

Wing Section.

The Wright Bros. did not know if they would be able to fly at all. They chose deeply cambered wing sections so that the maximum lift could be obtained at the minimum speed. The lift-drag ratio of their planes was probably about 12 to 1, very much better than still earlier experimenters could obtain with flat planes. Present-day wing sections enable us to get a lift-drag ratio of 17 to 18, while model tests have shown as good a ratio as 23.

For a given minimum speed we need more surface to support a given weight than with a more cambered plane with a worse lift-drag ratio. It would be an advantage if we could vary the camber of a plane to suit the speed, and many attempts to do this on an aeroplane in flight have been made. Unfortunately, apart from increased complication, the increased weight is likely to cause greater loss than gain.

Shortly before the war an experimental aeroplane was made at the Royal Aircraft Factory, which was fitted with wing flaps nearly the whole length of the plane. These flaps could either be turned down for low speed, or up for high speed, or they could be used differentially for balancing. It was, in fact, rather a crude way of varying camber. Although it achieved the distinction of being possibly the fastest aeroplane of the day, it was eventually considered that the extra weight and complication did not justify the device.

From many considerations it appears that much improvement in lift-drag ratio is unlikely, but when the speed of aeroplanes becomes very much greater than it is to-day, it is quite possible that some device for changing the section of a plane during flight will be found necessary to obtain a reasonably slow landing speed.

Plan Form.

Planes are generally made nearly rectangular in plan but with the ends more or less rounded. The ratio of span to chord is called aspect ratio and the higher this is made the better will be the lift-drag ratio. Here, again, it is necessary to compromise, as the bigger the span of the aeroplane the heavier will be the wings, the greater the resistance of the necessary bracing and the rapidity of the manœuvring of the whole aeroplane will be decreased. From practical consideration, therefore, the aspect ratio of an aeroplane is generally from 5 to 8 [*Id est* between 5 to 1, and 8 to 1.—Ed.]; recently some large aeroplanes have gone considerably beyond this figure, but it is very doubtful if anything has been gained.

Little is known as to the effect of using planes other than

roughly rectangular, but it is not very likely that much improvement will be found with planes of other shapes.

ARRANGEMENT OF SURFACES.

The original aeroplane of the Wright Bros. was a biplane, consisting of two planes separated by about the width of the chord. Shortly after, monoplanes, triplanes and quadruplanes were made and flown. It is fairly certain that the most efficient plane is the monoplane, for there is no possibility of interference of the planes as there is on the multiplane. [The lecturer omitted to consider the head-resistance caused by the large amount of wire bracing needed above and below the wings in a monoplane.—Ed.] A biplane, however, is probably only a little worse than the monoplane, while a triplane is a little worse than a biplane and so on. Structurally, the biplane is very much easier to make than the monoplane and, owing to this, the biplane construction has been almost universally adopted. Triplanes and quadruplanes have not had very much success although it is quite possible that for very large aeroplanes the advantages gained in construction may outweigh the disadvantages of their somewhat low effectiveness.

From time to time suggestions have also been made that the amount of wing surfaces should be varied. This again is a complicated thing to do, and with modern wing sections there is practically never any gain in reducing wing surface, in fact most aeroplanes would fly faster and not slower by having more surface if such surface could be introduced without extra weight or external resistance. This applies particularly to flying at heights.

WEIGHT.

The total weight that is carried on an aeroplane is obviously all-important, and it will, therefore, be useful to see what prospects we have of decreasing the weight of aeroplanes of any given type. We will divide the aeroplane into the following components:—(1) Useful load; (2) motor unit; (3) fuel, oil, and tanks; (4) remainder, being aeroplane parts proper.

For the purpose of general analysis it is assumed that the motors consume the same amount of petrol per b.h.p. per hour and the figure 0.7 lbs. per h.p. hour is sufficiently accurate to cover the weight of fuel, oil, tanks, and pipes. There are, of course, engines which do better than this, and many which do considerably worse. It is, however, a fairly good average.

Analysing a number of aeroplanes that have been used under active service conditions, it has been found that, apart from the useful load, the motor unit, and the petrol, oil, and tanks—the remainder representing the aeroplane proper—is very nearly one-third of the whole weight—32 per cent. being rather nearer. This weight includes the wing structure complete, the body complete with its fairing, floor, seats, controls, instruments, etc., the tail plane, elevator, rudder and fin, and the landing gear and tail skid. This weight is on the average made up as follows:—

	Percentage of Aeroplane parts.	Of total weight.
	%	%
Wing structure complete	41	13
Body complete	41	13
Tail plane, elevator, rudder, and fin	6	2
Landing gear	12	4

If we take 32 per cent. as the weight of the aeroplane proper we have the balance of 68 per cent. to divide up amongst the motor unit and its fuel and the useful load.

We have now only to decide what percentage of useful load we shall carry, and for what time it is to be carried, and we can find at once the weight per horse-power of the complete machine. We shall see that from the figure of lbs. per horse-power of the loaded aeroplane we can get a very good idea of its probable performance.

POSSIBILITIES OF REDUCTION OF WEIGHT.

The weights of the aeroplane parts have now been fined down to a considerable extent and except for the use of the newer materials, progress in saving weight is not likely to be very pronounced. Undoubtedly as time goes on we shall learn to make equally strong structures for less weight and the development of aluminium alloys and pressed metal construction may help to a marked extent. At the present moment wood is used very largely in the construction of both the bodies and wings. To a great extent this is due to war urgency, and no doubt aeroplanes of the future will be made of more durable materials.

The chief particular in which it is probable that weight will be reduced is in the weight per horse-power of the motor. Although progress in this respect has been remarkable, it is probable that we have not nearly reached the limit of weight in internal-combustion motors. At the present day the complete motor unit, i.e., the motor itself, the airscrew, water and radiator if water-cooled, exhaust pipes, and so on, weighs generally from 3 to 4 lbs. per horse-power. Certain very light motors have been made in which the weight is very little more than 2 lbs. per horse-power. It is quite conceivable that in the next few years motor units of 1½ lbs. per horse-power will be available, and in all possibility with the improvement in material will enable us to make motor units weighing not more than 1 lb. per horse-power in the more distant future.

With regard to fuel consumption the best petrol motors have a brake thermal efficiency of about 30 per cent. It may be this will be improved, and here again saving of weight may be effected.

The only motive power used to-day is supplied by internal-combustion engines. Some day no doubt a lighter form of motive power will be developed, and it is in this respect that the most startling progress may be expected.

RESISTANCE OF THE AEROPLANE TO FORWARD MOVEMENT.

The resistance of the aeroplane is made up of two factors. The first is the resistance of the main planes. The second is made up of the resistance of the body, the struts, wires and fittings of the wings, the landing gear, tail plane, rudder, and so forth. These can all be grouped together under the general term of body resistance. It is in respect to the reduction of this resistance more than anything else that the modern-day aeroplane owes its superiority over that of the original Wright machine.

The first man who seems to have understood the importance of reduction of resistance was the late Edouard Nieuport, who in 1909 produced an aeroplane with a very fat body which almost completely enclosed the pilot and succeeded in making a big improvement in speed on an aeroplane of comparative small power. Since that day all modern aeroplanes have been enclosed as completely as the requirements of the pilot's view allows.

DETAILS OF RESISTANCE.

The resistance of the external parts of the aeroplane has now been fined down to a considerable extent. The various components of the aeroplane will generally be found to have the following proportional resistances:—

	per cent.
Body	62
Landing gear	16
Tail plane, fin, rudder and elevator	7
Wires, struts, and fittings of the wing structure	15

It will be noted that by far the larger part of this resistance is made up of the body itself. A large part of the body resistance, however, is really used in providing cooling for the engine, whether it is an air-cooled or water-cooled engine. Whether the radiator is let into the body or is external to it does not appear to make a great deal of difference. [The opinion is very much open to question.—Ed.] The body is also of greater resistance than it need be, as it is necessary that the pilot shall have a good view and shall not be entirely enclosed. Bodies round in section are somewhat lower in resistance than the square bodies, but the difficulties of manufacture generally make their use undesirable. [The difficulties of manufacture of round section bodies do not seem to trouble the Germans.—Ed.] It is not likely that we shall be able to reduce the body resistance to a very great extent unless we can use a motor which does not require external cooling. It is true that it would be possible to use the complete surface of the body or of the wings as a radiator and by this means the waste of power would be negligible, but in order to do this the radiator becomes an impracticable and heavy piece of apparatus.

The resistance of the landing gear is considerable and it is difficult to see how this can be made much reduced. It has been suggested by many people that the landing gear could be stowed away inside the body while the aeroplane is in flight, and no doubt in the future this may be done. It is, however, very difficult to design a folding landing gear without an undue sacrifice of weight or a large increase in the cross section of the body. [A recent American design, submitted to many people in this country, seems to present no great difficulties.—Ed.]

Another factor which influences the resistance of the aeroplane to a considerable extent is the increased resistance of the parts of the aeroplane that are in the slip stream of the airscrew. The allowance to be made for this is not known very definitely, as in either a tractor or pusher aeroplane the resistance of the body itself tends to increase the efficiency of the airscrew.

THRUST AVAILABLE FOR FLIGHT.

The thrust available from the airscrew varies directly as the horse-power of the motor, directly as the airscrew's efficiency, and inversely as the forward speed of the aeroplane. If the efficiency is constant the thrust available at any speed will depend upon the horse-power of the motor, consequently the weight per horse-power of the whole aeroplane is an expression for the ratio of thrust to weight of aeroplane. As in practice the efficiency of the airscrew does not vary very much, and as the resistance of modern-day aeroplanes per lb. of weight is fairly similar, it is possible to predict rather roughly the performance of the aeroplane simply from the weight per horse-power figure.

There is considerable difference between the best attainable efficiency and that obtained under certain conditions.

As Lanchester has shown in "Aerodynamics," for maximum airscrew efficiency the pitch must be a little greater than the diameter. From first principles also it is easy to see that the

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diameter must be a certain minimum so that the loss in the slip stream shall be small. Now it is always convenient to have an airscrew as small as possible, for when it is smaller it will be lighter and less in the way.

Again, unlike the screw of a ship, the airscrew has to work at bigger thrusts when the aeroplane is going slow and climbing than when it is going at full speed on the level. As a consequence the airscrew of a modern aeroplane nearly always has its maximum efficiency when its effective pitch is at its largest, i.e., when it is going fast, and its efficiency is lowest when the pitch is small, that is, when the aeroplane is climbing.

Another disadvantage when the aeroplane is climbing is that the engine is more heavily loaded and in consequence the airscrew goes slower. With engines as they are this always means less horse-power. We need, therefore, either a change speed gear or an airscrew in which the angle of the blades can be changed. [M. Chauvière attempted this in 1913 or so.—Ed.] This will avoid a drop in horse-power and to a lesser extent the loss of efficiency when climbing. We also need, however, a propeller of varying diameter so that combined with a change of angle and a suitable engine speed we should get nearly a maximum efficiency under all conditions.

There is not much room for improvement in airscrew efficiency working under the best conditions, as the efficiency is as high as 85 per cent. When climbing, however, the efficiency will frequently drop to less than 65 per cent.

Attempts at variable pitch or variable angle airscrews have been made, but none seem to have reached a practicable stage. The design of such a screw is quite possible and no particular invention is required to make it a success. As the demand undoubtedly exists, variable pitch airscrews will be made successfully and will become a standard part of the aeroplane equipment in the near future in all probability.

PERFORMANCES OF THE FUTURE.

The aeroplane flown by the Wright Bros. had a speed of 30 to 35 miles per hour, and we have in a few years made aeroplanes that fly four times as fast. What then are the prospects of the future? Before considering this we must consider the effect of height on the speed at which an aeroplane flies.

The speed drops steadily as the height is increased, i.e., as the density of air is decreased. The reasons for this drop in speed are rather too lengthy to state in this paper. Very briefly, the resistance of the aeroplane and the horse-power of the engine each fall off when the density of the air decreases, but with engines as now designed the horse-power falls off faster than the resistance.

It is now proposed to consider what speed we are likely to attain in an aeroplane of the future flying at a height of 10,000 feet. As it is a hypothetical aeroplane engine, we are entitled to assume that all the improvements outlined in the preceding paragraph are incorporated into it. The assumptions we will make are :—(A) That the planes have variable camber. (B) That the motor unit weighs 2 lbs. per horse-power and will maintain this horse-power at all heights up to 10,000 feet. (C) That the body is the best possible shape, completely enclosed with no external fittings. (D) That the landing gear shall be folded inside the body during flight. (E) That the airscrew efficiency shall be 85 per cent. (F) That the percentage of useful load carried shall be 15 per cent. (G) That the duration of the flight shall be two hours.

Assuming that the weight of the structure is as at present, the weight per horse-power of the complete aeroplane will be 6.4 lbs. As we are considering a faster aeroplane than is at present made it may be as well to allow a little more weight for the aeroplane structure and we will assume that the weight per horse-power is 7 lbs.

We will now turn the percentage weights into lbs. by assuming that the useful load is to be 450 lbs., which may be two people and luggage or perhaps one man and mails. The gross weight of the aeroplane will therefore be 3,000 lbs. and the h.p. of the motor 430. We will imagine that the aeroplane is of a type in which there is practically no resistance due to the slip stream of the airscrew; also that the motor requires no external cooling. In order to accommodate the engine and crew we will consider that the biggest cross section of the body is 12 sq. ft. approximately round in section. The resistance of such a body will be about 2 lbs. to the sq. ft. at 100 ft. a second forward, i.e., 24 lbs. in all.

The resistance of the rest of the aeroplane by careful design can be kept down to 16 lbs. at 100 ft. a second, consequently at that speed the total resistance other than the wings will be 40 lbs.

The area of the wings necessary will be governed by the speed at which it is considered reasonable to land; taking 60 miles per hour as a possible speed and assuming that the planes can be converted into a deeply cambered section for landing, the permissible loading of the aeroplane will be 15 lbs. per sq. ft., making a total surface of 200 sq. ft.

We will now take a speed of 350 ft. a second, or 240 miles per hour and find the horse-power required at a height of 10,000 ft., i.e., where the density of the air is .74 of the normal. The wing drag may be taken as a fifteenth of the weight as with wings of varying camber we shall be able to get a high lift-drag ratio even at a small lift coefficient. The resistance due to wing drag, therefore, will be $\frac{3{,}000}{15}$ which is 200 lbs.

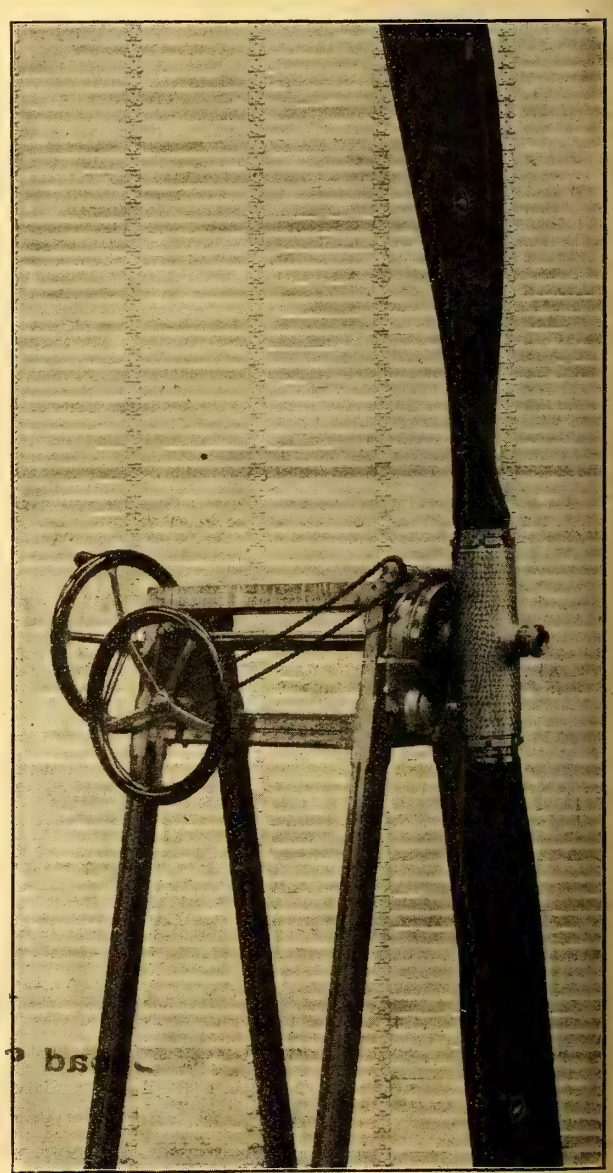
As the aeroplane is flying at 350 ft. a second the body drag will be 3.52 times what it was at 100 ft. a second, which will be 490 lbs. As, however, the air is 26 per cent. less dense its resistance will be reduced to 364 lbs. [Which is doubtful.—Ed.]

The total drag will be the sum of the body drag and the wing drag 564 lbs. in all. Taking an airscrew efficiency of 85 per cent. on the power required for flying will be very nearly 430, which is just the power available.

The example just taken may seem fantastic to many people here to-night; it must be remembered, however, that when the Wright Bros. were flying at 40 m.p.h., speeds of 150 may have seemed to them equally fantastic. On the assumptions we have made it is reasonably certain that a speed of four miles per minute can be obtained, and as motors of less weight per horse-power become available there is no reason why this speed should not be exceeded.

The rate of progress in increase in speed will depend upon the demand for speed. If war were to last it is almost certain that speeds of much more than 200 m.p.h. would be common in quite a few years from now.

[Capt. Green here exhibited a picture of a biplane with a pusher airscrew arranged after the American Gallaudet fashion and a nose like that of a Crutiss boat, which suggests that he now goes to America for new ideas instead of following the custom of the R.A.F. during the era in which he was connected with that



A Variable Pitch Chauvière Airscrew, exhibited in March, 1914.



From a painting by Mr. SANDFORD PITT.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

establishment, when the habit was to collate the ideas of the best contemporary "Trade" aeroplanes.—Ed.]

STABILITY AND CONTROL.

In the original Wright aeroplanes no attempt was made to obtain stability. The aeroplane was definitely unstable and required considerable care on the part of the pilot to keep it in equilibrium.

The early French aeroplanes were a little better in this respect, but the first aeroplanes to prove that it really was stable, i.e., it could fly without control, was that designed by Lieut. Dunn. This was an aeroplane of somewhat curious construction and never became a success, although it certainly was stable; on a windy day it was somewhat difficult to persuade it to fly on a straight course and its control when landing seems to have been insufficient. Lieut. Dunn, however, certainly showed that a completely stable aeroplane was a possibility.

About the time at which Dunn was making his experiments certain German designers claimed that they had produced a stable aeroplane. No records seem to exist of any test that proved their aeroplanes were stable, and in any case they certainly suffered from lack of control.

[Captain Green might obtain information by studying the work of Mr. José Weiss in this country and of Igo Etrich in Austria and Germany from 1908 to 1911, and the work of Herr Fokker in 1911-1912. At least two R.N. officers could give him some facts about the last-named, based on personal experience.—Ed.]

The first aeroplane of normal type that was proved to be stable was produced as the result of experiments carried out by the late Edward Busk. An aeroplane known as the R.E.1 was used for the first experiments and it was modified until it was made completely stable. Tests were carried out in order to prove that this aeroplane really was stable, and with Busk as pilot, carrying Colonel Sykes as observer, a flight was made from Farnborough to Salisbury Plain, in which the only control used was the rudder, and this for part of the time at least was worked by Colonel Sykes.

Since that day most English aeroplanes have been designed to be stable; it has been found that for purposes of fighting an aeroplane that is extremely controllable is necessary, and it has been also found that if an aeroplane is made too stable the controls are apt to become too heavy to make the aeroplane sufficiently sensitive. In modern day aeroplanes intended for war purposes the aim of most designers is to make the machine just comfortably stable over the range of speeds used in ordinary flight, but to provide sufficiently large controls that the inherent stability of the aeroplane can be entirely overcome.

It is often asked if we have stable aeroplanes why do we still have flying accidents? It would be quite possible to design an aeroplane in such a way that whatever the pilot did with the controls he would be unable to upset the equilibrium of the aeroplane. Such an aeroplane, however, would be valueless for fighting, and as practically all aeroplanes nowadays are made for war purposes there must continue to be an element of danger for the unskilled pilot.

STRUCTURAL STRENGTH AND SIZE.

Increase in speed and the increase in controllability both tend to increase the stress that will be put on the structure of an aeroplane in flight. Experiments in the increased loads that are likely to occur when doing sharply banked turns and loops have shown that the load is frequently increased to three or four times the normal.

Present day aeroplanes have to be very much stronger than before. Modern machines that are expected to manœuvre rapidly are not considered tolerably safe unless the wings can support at least six times the weight of the aeroplane. Fortunately, large aeroplanes for peaceful purposes will not be required to manœuvre very rapidly. This fact will have an important bearing on the possibilities of aeronautics.

In an earlier paragraph it was stated that the proportional weight of the aeroplane parts proper was more or less constant. This applied only to machines of the sizes that are used now, i.e., up to about 6 tons loaded weight. As aeroplanes are made bigger, if they are designed on similar lines, the weight of the wing structure per square foot will increase, assuming they are to be designed for the same factor of safety. It is true that on the large aeroplanes now made this increase of weight is not very apparent because greater trouble is taken to economise in the design of the wings. This increase of weight, however, is likely to be important for machines of much larger size, but as we shall be able to use somewhat lower factors of safety the weight of the wing structure will not increase as rapidly as it would otherwise have done.

There certainly is a limit of size to which it is possible to build an aeroplane; what this size will be the future will show. It is safe, however, to say there will be no serious difficulties in building aeroplanes two or three times as big as the largest we have considered.

We have no logical right to think that our flying machines of to-day are more than the crudest caricatures of the aeroplanes of the future. We engineers are a little apt to become so engrossed in our immediate difficulties of design that we do not see further ahead than is suggested by our own ideas, and make predictions for the future that only follow along the lines of progress that we can clearly see.

The writer has often been asked if he thinks that flying will ever become an ordinary means of travel. His answer is that he does not think, but that he knows it will become so. Ten years ago to attempt to fly from place to place was considered suicide; five years ago it was an adventure; to-day to many of us it is a very ordinary affair. A few years more and we shall laugh to think of the aeroplanes of which we are now so proud, we shall shudder at the risks we ran, and we shall travel with comfort, speed, and safety.

[If the After-the-War Government and its friends does not abolish aircraft, as being the rich man's luxury, or does not make it illegal to fly on the grounds that aircraft are a menace to international peace, or does not make flying a Government monopoly.—Ed.]

A number of diagrams were shown illustrating the lecture and some photographs of various aeroplanes of more or less historic interest. Incidentally the lecturer appeared to be under the impression that the Curtiss biplane, which won the Gordon Bennett race in 1909, was the Voisin of that period—a somewhat curious slip for a technical historian to make.

THE DISCUSSION.

In the discussion which followed the lecture MR HANDLEY PAGE, who was first called upon by the chairman, remarked that it was somewhat difficult to discuss technical aeronautics owing to the limitations of the censorship. He did not agree with the lecturer that the Wrights were the first people to use cambered planes, and pointed out that the Herr-Professor Lilienthal used cambered planes. The Wrights adopted cambered planes because they worked on Lilienthal's results.

Passing to the subject of the big aeroplanes of to-day, Mr. Page explained that one cannot expect enormously high speeds from weight-carrying machines, and compared the weight carrier with the motor lorry, the small fighting machine being analogous with a racing car. He remarked that he was glad to see that Captain Green had been converted since the last discussion on this subject to understanding that structural weights in big aeroplanes did not necessarily go up in the proportion which had hitherto been believed.

MR. ORMSBY advocated a higher aspect-ratio in planes, which he suggested should be obtained by arranging the planes like a Venetian blind, and he said that he had seen models which gave a lift to drag ratio as high as 27 to one [On this point one may remark that the Venetian blind aeroplane was actually tried on quite a large scale model by Mr. Horatio Phillips a good many years before anybody actually flew. The drawback to such a system from the practical point of view is that it would probably interfere with the view of the crew of the machine, also, if carried to extreme limits, the movement backwards and forwards of the topmost and lowermost planes, as the machine pitched fore and aft, would probably have curious aero-dynamic effects.—Ed.]

SQUADRON COMMANDER THE MASTER OF SEMPILL, R.N., referred to the use of reversible blades of airscrews as an extension of the variable pitch idea, and suggested that reversible blades would probably make a very good air brake. On the subject of head resistance he expressed the opinion that there is a good deal of unnecessary head resistance in under-carriages, and that it is due to the collection of material caused by the type of shock-absorber commonly used. He said that the German Gotha machines have a very neat shock-absorbing device, in which a cable from the wheel-axle runs over a pulley and up inside the under-carriage struts to a spring fixed inside the fuselage.

MR. BERTRAM COOPER, formerly Secretary of the Aeronautical Society, recalled that the first cambered plane on record was made by Sir George Cayley in 1809, and that Sir George Cayley also made a glider which operated successfully with cambered planes, so Great Britain might claim to have originated cambered planes.

MR. HENRY KNOX, of the All-British Engine Co. (A.B.C.), said that he quite realised how the hand of the censor prevented the lecturer from dealing intimately with modern technical aeroplane history, and was interested to see how Captain Green had, as an alternative, taken unto himself the mantle of Mr. H. G. Wells. He (Mr. Knox) desired to point out how much Great Britain had done to make the history of the aeroplane. He recalled the fact that when Mr. Sopwith took his first "Tabloid" to Paris and told M. Blériot about its extraordinary range of speed, M. Blériot received him most politely, but with a distinct air of being so sorry that such a nice young man should believe such fantastic figures about his own machine. [The "Tabloid" biplane had a range of speed of between 36 and 92 m.p.h., which was in advance of any monoplane or biplane of its time, so M. Blériot's polite incredulity can be forgiven.—Ed.]

Mr. Knox further pointed out that just as Mr. Sopwith had made history with the small machine, Mr. Handley Page had made history with big aeroplanes. In the same way Commander John Porte, R.N., had made history with the big flying-boats of his design. [One was glad to note that the audience showed by their applause their appreciation of the services done by these three gentlemen to the technical history of the aeroplane, and to

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the King's Services. Doubtless if the lecturer had been less preoccupied with the performances of other and supposititious aeroplanes he would not have omitted to mention three such important and historic steps in technical aeronautics.—Ed.]

Further, Mr. Knox said that we might very possibly find that big machines are more economical than smaller machines, just as the "Mauritania" and certain big naval vessels are certainly more economical at high speeds than small ones. He also suggested that it was possible to design an aeroplane that would fly at its best speed at a considerable height.

MR. BORLASE MATHEWS spoke concerning some of the figures shown. He remarked that the weight of an aeroplane was not merely increased by the weight of the engine but by the weight of the bigger engine girders necessary to take big engines. He also remarked on the difficulty of closing in under-carriage gear, and he suggested that the Gotha shock-absorber device was due to lack of rubber more than to other reasons.

DR. MULLINEUX-WALMSLY, of the Northampton Institute, explained to the audience that under war conditions the discussion before the Society could not be highly informative, owing to the necessity for keeping very essential facts secret

CAPTAIN KENNEDY, referring to a machine which he had seen Mr. George W. Beatty fly at Hendon some years ago, wanted to know who was the first person to use two or more propellers.

COLONEL O'GORMAN put forward an interesting point which will probably be new to most people, namely, the surprisingly small amount of actual invention which has been needed to produce modern aeroplanes. He said that in the development of the aeroplane, actual invention had very seldom been needed at all, but that each step came as a natural process of development through experiment from known facts.

[This somewhat uncomfortable home truth may possibly be very useful information to a number of people who imagine that aeroplanes have been invented, instead of merely having grown, and that the continued development of aeroplanes in the future will depend also on inventions. As a matter of fact, the people who are most use in the Aircraft Industry are those who bring out useful modifications.—Ed.]

Colonel O'Gorman quoted the saying of Swinburne—the engineer, not the poet—that any fool could make an invention, but it needed a very clever man to work it out, and a genius to sell it Most of the inventors whom Colonel O'Gorman had come across were certainly not genii in this direction. Colonel O'Gorman further made the somewhat startling statement that all safety devices, such as landing lamps, parachutes, etc., such as might be imposed by the Board of Trade after the war, make for the death of the pilot.

[Evidently, what Colonel O'Gorman meant was that if one starts over-loading machines, especially in the future, when commercial aerial transport comes into being, with safety devices imposed by regulations, so much attention would be paid to the supplementary gadgets both by the manufacturer and the pilot that the aeroplane itself would be likely to suffer. One suggests the analogy of an effort to make an unsinkable ship in preference to making an easily sinkable ship, and equipping it with a multitude of life-saving apparatus. It is, of course, obviously better to concentrate on making a vehicle itself as safe as possible, but one takes it that Colonel O'Gorman did not mean his statement to be taken by any means literally.—Ed.]

THE LECTURER'S REPLY.

In replying on the discussion, CAPTAIN GREEN appeared to ridicule Mr. Knox's statement that an aeroplane can be designed to fly its fastest at a height, and laboured the point to some considerable extent.

[One can only assume that Captain Green's experience of aeroplane designs has not included various machines which are so lightly loaded that when their engines are opened up to full power their natural inclination is to climb, with the result that when flying near the ground, they have actually to be held down, and that their speed near the ground is considerably less than it is when they reach a height at which they assume their best speed flying angle. Possibly, in view of the generally heavy construction and the commonly over-loaded state of the aeroplanes built at the Royal Aircraft Factory during Captain Green's sojourn there, his ignorance of this particular phenomenon in the history of technical aeronautics may be excused.—Ed.]

On the subject of engines he remarked that the ratio of compression in modern aero-engines was in the ratio of five to one. On the subject of head resistance, he did not think that shock absorbers accounted for any big proportion of head resistance.

On the subject of cambered planes, he thought that the Wrights first used them because others had tried to fly without them and had failed. [One would remind Captain Green that cambered planes with a streamline entry had been invented and patented and tried successfully in this country by Mr. Horatio Phillips some time before the Wrights flew, but that his machine failed to fly owing to lack of a proper engine, that the late Sir Hiram Maxim also tried to fly with cambered planes long before the Wrights succeeded, and further, that investigation of the Wrights' early experiments will show that they used a cambered plane because it had already been used successfully on gliders. This appears to be another point in the technical history of the aeroplane which the lecturer would do well to study before delivering his lecture elsewhere.—Ed.]

Continuing, Captain Green said that he did not fancy multiplanes, owing to the interference between one plane and another. Further he said that he did not think that Mr. Page was fair in saying that he, Captain Green, had been converted to Mr. Page's views on structural weights. [On which point one would merely like to suggest that whether Mr. Page was fair or not, does not matter, but he was certainly unwise to assume that anybody could teach Captain Green anything about aeronautics.—Ed.]

CAPTAIN GREEN said that he still thought big planes were heavier than smaller ones—presumably he meant per square foot of surface—but they can be made lighter because in a big machine it is possible to afford a lower factor of safety.

MAJOR HECKSTALL-SMITH, late of the Royal Aircraft Factory, now of the Nieuport and General Aircraft Co., Ltd., proposed a vote of thanks to Captain Green for his very valuable lecture.

APPRENTICES.

The following letter has been received :—

Sir,—I was unable to reply sooner to Mr. O. Paul Monckton's kind letter of criticism in your publication of October 31st, and I take this opportunity of thanking him and yourself for your kind appreciation of the scheme.

With regard to the Tool Room, I quite agree with Mr. Monckton that the best Tool-room hands are born mechanics, but I fear that the number who are born to love their work for work's sake is a very small one. Nevertheless, I certainly consider that Mr. Monckton's idea of a special grade of apprentices is a good one.

With regard to the Electrical Department in our factory, this only consists of a Maintenance Department, and, therefore, we should not guarantee to give a boy more than a smattering of electrical work, but should a boy evince a special aptitude for Electrical Engineering, he would always have the opportunity of being released from his Indentures with us in order to carry on in an established electrical business.

With regard to the Jig and Tool Drawing Office, it will be noted that this is the final stage of the Full Grade apprentice, and, therefore, there would not be a large number of youths who would qualify for this department, but their time in that department would not necessarily be curtailed to the three months, and they would be given an opportunity of continuing in it as long as they proved their value.

No mention is made, of course, with regard to the Test Bay, as, the scheme for apprentices still being in its first year, no boy would be qualified to spend time there until he had passed considerable time in the works, but it is a point which will certainly not be overlooked when the time comes.

Mr. Monckton's appeal to the Trade Unions, in the concluding paragraph of his letter, I most heartily support.

(Signed) A. W. TOWSE (General Manager, Peter Hooker, Ltd.).

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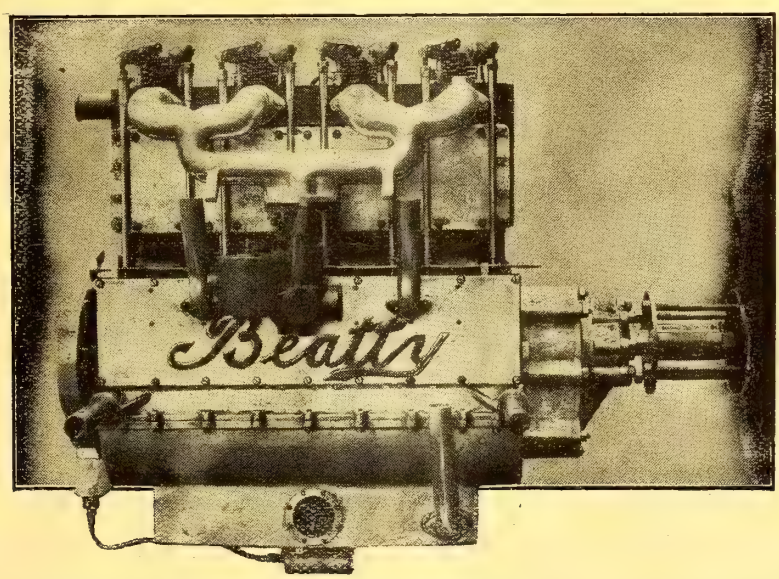
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The British Gold Shell Ring Co., Ltd.,
ness Road, Hounslow, London. "
Hounslow." Hounslo

BUYERS' GUIDE.

tal Parts and Fittings (*contd.*)—

ritish Metal (Kingston), Ltd., Kingston-on-Thames.
lann, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston-road, London." Museum 70.
ountford, Fredk., Ltd., Fremo Works, Lifford, Birmingham "Fremo, Birmingham." Kings Norton 261.
ubery, Owen, & Co., Ltd., Darlaston. "Roofs, Darlaston." Darlaston 87.
inkey, Joseph, & Sons, Ltd., Wellington, Shropshire. "Sankey, Wellington, Salop." Wellington 66.
he Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.
he Aircraft Construction Co., Harlev Works, Beckton Road, E.16. "Aercracons, Canning, London" East 1300.
hompson Bros., Ltd., Bradley, Bilston. "Thompson Bros., Bilston." Bilston 10.
ooler Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10.

:al Shearing Tools—

ontgomery, Smith, & Co., Ltd., Tangent Works, Keynsham, near Bristol. "Ingenuity, Saltford." Keynsham 21.

:al Spinnings—

abriel & Co, 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

ric Bolts—

ishmore Bros., Zota Works, Hildreth Street, Balham, S.W. Battersea 415.
ubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

cellaneous—

nderson, D., & Son, Ltd. (Roofs), Belfast. "Anderson, Belfast." Belfast 4033-4034-4035.
nti-Glare Glass Co., Ltd., 76, Turnmill Street, E.C. Central 3731.
owden Wire, Ltd., Willesden Junction, "Bowirelim, Harles, London." Willesden 2400 (3 lines).
ritish Metal (Kingston), Ltd., Kingston-on-Thames.
own Bros., Ltd., Great Eastern Street, E.C.1. "Imbrowned, Bethroad, London." London Wall 6300.
ndolithic Manufacturing Co., Ltd., 61½, Fore Street, London, E.C.2. Labels in Metal, Ivory, Ivorine, etc.
erbert Frood Co., Ltd., Chapel-on-le-Frith. "Frodobrake, Birmingham." Central 703.
asso Manufacturing Co., Ltd., 211, City Road, E.C. City 9558.
ndon Label Co., Ltd., Harlev Works, Beckton Road, E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.
acLennan, J., & Co., 30, Newgate Street, E.C.1., and at Glasgow. Tapes, Cords and Threads. City 3115.

:or Cars—

rol Johnston, Ltd, Dumfries. "Mocar, Dumfries." Dumfries 281-282.
ann, Egerton & Co., Ltd., 379/381, Euston Road, London, N.W.1. "Manegecar, Euston-road, London." Museum 70.
andard Motor Car Co., Coventry. "Flywheal, Coventry." Coventry 530 (4 lines).

neplates and Labels—

ritish Metal (Kingston), Ltd, Kingston-on-Thames.
ndolithic Manufacturing Co., Ltd., 61½, Fore Street, London, E.C.2.
ie Clegg Metal Engraving Co., Chatsworth Works, Worthing. "Clegg Worthing."

servation Panels—

riplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

achutes—

R. Calthrop's Aerial Patents, Ltd., Eldon Street House, Eldon Street, London, E.C. "Savemalivo, Ave, London." London Wall 3266-3267.

ent Agents—

ing's Patent Agency, 165, Queen Victoria Street, E.C.4. Central 682.
age & Rowlingson, 27, Chancery Lane, E.C.4. Central 332.
tanley Popplewell & Co., 38, Chancery Lane, W.C.2. Central 1763.

tern Making—

redk. Ward, 6, 7 and 8, Allsop Street, Upper Baker Street, W. Padd 4743.

trol Storage (Bulk)—

ywater & Co. (The Hydraulic System), Craven House, Kingsway, London, W.C.2. "Bywaterist, London." Gerrard 2220.

ton Rings—

ritish Chuck & Piston Ring Co., Coventry. "Rings, Coventry." Coventry 723.

wer Presses and Dies—

liss, E. W., & Co., 2a, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon, London." Hop 4340.

esswork—

Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851
Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.
Integral Propeller Co., Ltd. "Aviprop, Hyde, London." Hendon 9. Kingsbury 104.
Lang Propeller, Ltd., Weybridge. "Aerosticks, Weybridge." Weybridge 520-521.
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich" Norwich 482 (4 lines).
Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 291, Leeds.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

Rigging for Aircraft—

Cradock, G., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466. Enfield 520 (6 lines).

Rubber Tubing & Accessories—

Hancock James Lyn, Ltd, 266, Goswell Rd., London, E.C.1. "Masticator, Isling, London." City 3811 and 3812.

Safety Belts—

Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.

Sand and Die Castings—

Coan, R. W., 219, Goswell Road, London, E.C. "Krankases, Isling, London." City 3846.

Scientific Instruments—

The Foster Instrument Co., Letchworth, Herts. "Instrument, Leeds." Chapeltown 474.

Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay, 345 (3 lines).
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.
Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton." Southampton 1337.

Searchlights and Landing Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Seats for Aeroplanes—

Bowser, E., Art Cane Works, 50 Park Lane, Leeds. Central 3437.

Shackles—

The British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow. "Golshel, Hounslow." Hounslow 254.

Sheet Metal Pressings—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.
W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk, Bham." Central 550.
British Metal (Kingston), Ltd., Kingston-on-Thames.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 497 Birmingham.
Nicholls & Lewis, Ltd., 16, Princep Street, Birmingham. "Colpressed, Birmingham." Central 7188.
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines)

Sheet Metal Work—

British Metal (Kingston), Ltd., Kingston-on-Thames.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.

Shock Absorbers (Elastic Cord)—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.

Sparking Plugs—

Forward Motor Co., Sumner Row, Birmingham. Central 6259.
Hobson Manufacturing Co., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.
Lodge Sparking Plug Co., Ltd., Rugby. "Igniter, Rugby." Rugby 235.
Ripault, Leo, & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758.

Springs—

Dart Spring Co., West Bromwich. "Dart, West Bromwich." West Bromwich 322
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Steel—

Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237.
Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham." Smithwick 224.

Steel Tension Wires—

Cradock, G., & Co., Ltd., Wakefield. "Cradock, Wakefield." Wakefield 466 (3 lines).

Steel Tubes for Aeroplanes—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Taper Pins—

Mountford, Fredk. (Birmingham), Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262

Tapes and Smallwares—

MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.
James North Hardy & Son, Ltd., 54, Portland Street, Manchester "Hardson, Manchester." Central 6471.

Timber—

Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Entikosil, Vic, London." Victoria 5073 4210.
Brown, R. F., & F. W., Wollaton Saw Mills, near Nottingham. "Brown's Saw Mills, Wollaton." Nottingham 1526.
J. Owen & Sons, Ltd., 199a, Borough High Street, S.E.1. "Bucheron, London."

Time Recorders— Hop 3811 (2 lines).

Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310

Turnbuckles—

Rubery Owen & Co., Darlaston, South Staffs "Roofs, Darlaston." Darlaston 87 (3 lines)

Tyres and Wheels—

The Palmer Tyre, Ltd., Shaftesbury Avenue "Tyricord, Westcent." Gerrard 1214 (4 lines)

Varnishes—

Clark, R. Ingham, & Co., Caxton House, S.W.1. "Pearline, Vic, London Victoria 2923
Harland, W., & Son, Merton, London, S.W.19 "Harland, Wimbledon 45." Wimbledon 45 and 1395
Naylor Bros., Ltd., Southall, Middlesex "Naylor, Southall." Southall 30.

Washers—

Herbert Terry & Sons, Ltd. Redditch. "Springs, Redditch." Redditch 61

Watchmakers and Jewellers (Silver Models)—

Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 0091 (3 lines).

Welding and Cutting Plant—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Welding Repairs—

Barimar, Ltd., 10, Poland Street, W.1. "Barimar, Reg, London" Gerrard 8173
Imperial Light, Ltd, 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London."

Wind Shields— 3540 Victoria (3 lines).

Auster, Ltd., 133, Long Acre, W.C. "Winflector, London." Regent 5910.
London Label Co, Ltd, Hadley Works, Beckton Road, E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1 "Shatterlys, Piccy, London." Regent 1340.

Wire Gauze—

N. Greening & Son, Ltd., 16, Finsbury Street, London, E.C. "Setscrew, Finsquare, London." London Wall 1082.

Wires and Cables (Aeroplanes)—

Bruntons, Musselburgh, Scotland. "Wiremill, Musselburgh." Musselburgh 28.
Cradock, Geo., & Co, Ltd., Wakefield. "Cradock, Wakefield." Wakefield 466 (3 lines).

Wirework—

Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Woodworking Machinery—

Robinson, Thomas, & Son, Ltd., Railway Works, Rochdale. "Robinson, Rochdale." Rochdale 467.
Sagar, J., & Co., Ltd., Halifax. "Sawtooth, Halifax." Halifax 136.
Wadkin & Co., Leicester. "Woodworker, Leicester." Leicester 2614.

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Acetylene Welding Plant—
Acetylene Corporation of Great Britain, Ltd., The, 4th Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, Phone, London." 3540 Victoria (3 lines).

Aeroplane Manufacturers—
Aircraft Manufacturing Co., Ltd., Hendon. "Airmanship, Hyde, London." Kingsbury 180.
Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne." Gosforth 500
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.
British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol." Bristol 3906.
British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudroplan, Cricklewood, London." Hampstead 555.
Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6. Hampstead 4403 and 4404.
Davidson Aviation Co., Ltd., Hammersmith, W.6 Hammersmith 1144-1145
Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1170.
Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 120.
Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophid, Crickle, London." Hampstead 7420.
Mann, Egerton & Co., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines)
Martinsyde, Ltd., Brooklands, Byfleet "Martinsyde, Weybridge." Woking 331; Byfleet 171.
National Aircraft Co., Ltd., 15, Hackney Road, N.E.2. London Wall 6745
"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London." Willesden 2455.
Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48.
The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis, London." Putney 2240-2241.
Ros, A. V., & Co., Ltd., Manchester. "Triplane, Manchester." City 8530-8531, Manchester.
Sage, Frederick & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes."
Short Bros., Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London." Regent 378.
Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston." Kingston 744
Standard Aircraft Manufacturing Co., Effingham House, Arundel Street, W.C.2. "Gunsignrush, Estrand, London." City 80
Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickerfuto, Knights, London." Kensington 6800.
Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.
White & Samuel, & Co., Ltd., East Cowes. "White, East Cowes." Cowes 3

Airships—
Airships, Ltd., High Street, Merton. Wimbledon 1314
Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, Phone, London." Regent 378.

Aluminium Castings—
Coan, R. W., 219, Goswell Road, London, E.C.1. "Krankases, Isling, London." City 3846

Bearings (Etonia Cast Phosphor Bronze)—
Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3927.

Brass Sheets for Tipping Propellers—
Lucraft, H., & Co., 147, Fenchurch Street, London, E.C.3. "Lucraftia, London." Avenue 2217.
Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 965, 966, and 7066.

Buildings—
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation Norwich." Norwich 851,
Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
The Wilkes Co., Ltd., Salisbury House, London Wall, E.C.2. "Wraithless, Phone, London." City 2681-2

Cable Coverings and Cable Controls—
Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Capstan Work—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Carburettors—
Holson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.

Casein—
Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3. "Suriedum, Fen, London." Avenue 34 and 35.

Castings—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Lucraft, H., & Co., 147, Fenchurch Street, London, E.C.3. "Lucraftia, London." Avenue 2217.

Castings (Aluminium, Brass, Bronze, Machined or Rough)—
Coan, R. W., 219, Goswell Road, London, E.C.1. "Krankases, Isling, London." City 3846.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Celluloid (Non-Flam.)—
Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7.
London Label Co., Beckton Road, E.16. "Lonlabel, Canning, London." East 1300.

Clothing—
Burberry's, Ltd., Haymarket, S.W.1. Regent 2165.
Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6.
Hood & Co., 4, Princes Street, Hanover Square, W.1. Mayfair 4071-2.
Robinson & Cleaver, Ltd., Regent Street, London, W.1. Gerrard 1070.

Component Parts—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (4 lines).
B. D. V. Aircraft Spares, Syon Chambers, 161, Kew Road, Richmond, Surrey. "Aeros, Richmond." Richmond 1681.
Central Aircraft Co., Palmerston Works, High Rd., Kilburn, N.W.6. Hampstead, 4728.
The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aerocranes, Canning, London." East 1300.
The Osborne Aircraft Co., Ltd., White Hill, Greenock, Scotland. "Cordage, Greenock." Greenock 618.

Cords, Tapes, and Threads—
MacLennan, J., & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.

Dopes—
British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312.
British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellutate, London." Regent 4046.
Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawb, London." London Wall 5350-3622.
Clark, Robert, Ingham & Co., Ltd., Caxton House, S.W.1. "Pearline, Vic, London." Victoria 2023

Electrical Accessories—
Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 1564.
Mann, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Fitzroad, London." Museum 70.
Premier Electric Heaters, Ltd., 258, 259, and 360, Bradford Street, Birmingham. "Fehrenheit, Birmingham." Midland 981.

Electric Cables—
E. Kalker & Co., Coventry. "Kalker, Coventry." Coventry 241.
Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 1564.

Electric Lighting and Power—
E. Stanley Fardon, A.M.I.E.E., 67, Mosley Street, Manchester.
Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 1564.

Engines and Parts—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford. "Pump, Bedford." Bedford No. 1.
Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.
The Beatty School of Flying, Ltd., The Broadway, Cricklewood, N.W.2. Hampstead 3000.
Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London." Gerrard 278.
Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London S.W.1. "Aeroflight, Vic, London." Vic 7026.
Gordon Watney & Co., Ltd., Weybridge. "Mercedes, Weybridge." Weybridge 550 (7 lines).
Green Engine Co., Ltd., Twickenham. Richmond 1203.

Engines and Parts (continued)—
Gwynnes, Ltd., Hammersmith Iron Works, Hammersmith, W. "Gwynnes, Hammersmith."
Napier & Son, D., Ltd., 14, New Burlington Street, London, W., and at Acton, W. "Napier, London." Gerrard 660.
Rolls-Royce, Ltd., 14 and 15, Conduit Street, London, W. "Rollsroyce, London." Gerrard 3737.
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.
Sturtevant, B. F., Co., Ltd., Hyde Park, Hayes, U.S.V.
Sunbeam Motor Car Co., Ltd., Wolverhampton. "Sunbeam, Wolverhampton."
The Gnôme & Le Rhône Engine Co., Ltd., 37, Victoria Street, S.W. "Engirhône, London." Walthamstow 408 (3 lines).

Flare Lights—
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, Phone, London." 3540 Victoria (3 lines).

Flexible Shafts—
Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Flying Schools—
Bournemouth Aviation Co., Ltd., Talbot Village, Bournemouth. "Etches, Winton, Bournemouth."

Furniture (Office)—
Cooke's (Finsbury), Ltd., Finsbury Pavement House, London, E.C.2. London Wall 573 and 574.

Galvanising—
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.
Cowper-Coles Manufacturing Co., Cheshunt, Thames. Sunbury

Gears—
Muss Gear Co., Ltd., Thomas Street, Aston, Birmingham. "Musgear, Birmingham." East

Glue—
Improved Liquid Glues Co., Ltd., 61 Heritage Street, E. (Croid.). "Lenacre, Wapp, London." Avenue
Mendine Co., 5, Arthur Street, E.C. Bank

Goggles—
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London."

Heating and Ventilating—
Chas. P. Kinnell & Co., Ltd., 65 & 68, Southwark Street, London, S.E. "Kinnell, London." Hop 372 (6 lines).

Instruments—
British Wright Co., Ltd., 33, Chancery Lane, W.C.2. Holborn

Instruments (Scientific, Aid meters, etc.)—
The Cambridge Scientific Instrument Co., Ltd., Cambridge "Instrument, Cambridge." Cambridge
Short & Mason, Ltd., Macdonald Road, Walthamstow, E.17. "Aneroid, Phone, Walthamstow 200."

Machine Tools—
Brewster & Co., 11, Queen Victoria Street, E.C.4. "Circumfuse, Cannon, London." City

Magneto Driving Pieces—
Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Magnetos—
The M-L Magneto Syndicate, Ltd., Victoria Works, Coventry. "Ceriton, Coventry." Coventry
The British Lighting & Ignition Co., Ltd., 204, Tottenham Court Road, W.1. "Lucigrad, Phone London."

Metal Manufacturers—
Clifford, Chas., & Sons, Ltd., Birmingham. "Clifford, Birmingham." Central

Metals in General—
Samuel Mercer & Co., 198, Upper Thames Street, E.C.4. "Reconciled Cannon, London." City

Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 965, 966, and 7066.

Metal Parts and Fittings—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (4 lines).
Aircraft Supplies Co., Ltd., Aerol House, Long Acre, W.C.2. Gerrard
London." Ltd., Hythe Road, Willesden
Arnott & Harrison, Ltd., Willesden Junction.
Bayliss, Jones & Bayliss, Ltd., Wolverhampton. "Bayliss, Wolverhampton" (Bolts and Nuts)
The Birmingham Guild, Ltd., 45, Gt. Charles Street, Birmingham. "Handicraft, Birmingham." Central
Blackburn Aeroplane & Motor Co., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
The British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow, London. "Golshel, Hounslow." Hounslow

Metal Parts and Fittings (contd.)—
Broad Metal (Kingston), Ltd., Kingston-on-Thames.
Brown, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston, London." Museum 70.
Cleveland Engineering Co., Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." Kings Norton 261
Darlaston Steel & Iron Co., Ltd., Darlaston. "Roofs, Darlaston." Darlaston 87
Elliott, Owen, & Co., Ltd., Wellington, Salop. "Sankey, Wellington, Salop." Wellington 66.
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.
The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aerocranes, Canning, London." East 1300.
Thomas Bros., Ltd., Bradley, Bilston. "Bilston, Bilston." Bilston 10.
Thompson Bros., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10.
Vickers Engineering Co., Ltd., Willesden Junction, N.W.10.

Metal Shearing Tools—
Manchester Shearing Machine Co., Ltd., Tangent Works, Smith, & Co., Ltd., Tangent Works, Keynsham, near Bristol. "Keynsham, Bristol." Keynsham 21.

Metal Spinnings—
Boulton & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Metric Bolts—
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Celluloid Manufacturing Co., Ltd., 61½, Fore Street, London, E.C.2. Labels in Metal, Ivory, Ivorine, etc.
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Presswork—
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Terry, Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers—
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Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851
Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.
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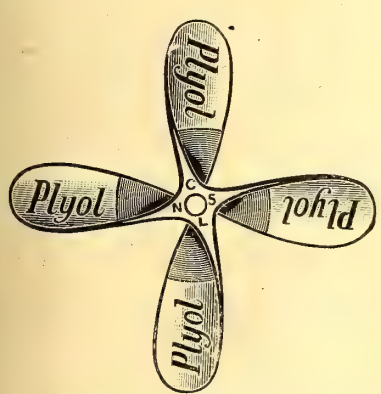
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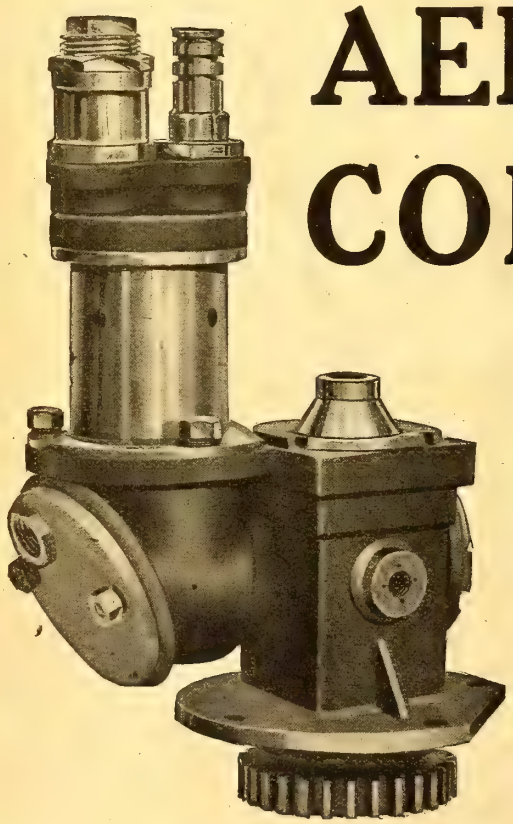
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One Industry or Two?

(SOME REMARKS ON THE RELATIONS BETWEEN AIRCRAFT AND MOTOR MANUFACTURING.)

[The following article is published in accordance with the custom of this paper of always being willing to give both sides of the question impartially.—Ed.]

I suppose that the position of anyone who ventures to suggest in the columns of The Aeroplane that aircraft and motor vehicles are as an actual fact the products of different branches of the same industry, may be fairly compared to Daniel strolling into the lion's den of his own accord. I can only hope that the results will be no more fatal. I quite realise the abject inferiority of all those things that move upon the earth and in or upon the waters below the earth, though I believe there is some Scriptural authority for assuming that, after all, they were all made by the same Creator as the fowls of the air.

I believe that it would have been admitted all along that the Aircraft and the Motor Industries are part and parcel of the same thing had it not been for the unfortunate fact that the manufacturer of aircraft got a rooted impression that the Motor Industry and the Society of Motor Manufacturers and Traders were identical. There is about the Society a certain great-avuncular manner which is apt to be irritating to aspiring youth.

The Society has a habit of patting itself upon the back and saying: "How kind I am to all my small and poor relations." These relations, as they grow larger and less poverty-stricken, are rather apt to begin to look a gift-horse in the mouth, with a view to deciding whether there may not be some ulterior motive in the presentation.

The Society is an admirable show-promoting body. It knows just how these things ought to be done and how to get the right people to attend them. It has turned its knowledge to good, substantial account, indicated by ample investments and a fat bank balance. It recognises honestly enough that at least a part of the profits of these exhibitions ought to be spent in the encouragement of new branches of the motor industry. Possibly its objects have not been altogether altruistic, but anyhow the result has been that the new industries in question have been given a distinct fillip.

Family Home Rule.

Later on, when these new industries have got older and say to the Society, "Give us at least some share in the government of the house," the great-uncle looks upon them with some displeasure and annoyance. "Surely," he says, "after all that I have done for you, you will not be so ungrateful as to suggest that you can now manage your own affairs without my guidance. Nevertheless I will be generous; I will give you a nice little corner all to yourself in which you can discuss your own affairs. When you have come to a decision, I will tell you whether the decision is good for you; and, if not, I shall refuse to allow you to act upon it."

Sooner or later the position is that of a young man who leaves his father's house because he is not allowed a latchkey, and has nowhere to ask his friends if they do not meet with the approval of the family. My argument is that, even when the inevitable happens, the fact of the relationship is in no way disturbed.

The nephew who lives in Belgravia may attempt to disown his uncle at Upper Tooting, but the old gentleman remains his uncle all the same. In the same way the pioneers and the disciples of aviation may literally and metaphorically soar to heights from which they can drop bombs, propellers, pilots, and other high explosives on to the heads of the antediluvian population which still crawls below. They may be superhuman, but still they remain human.

The Motor Family.

Neither does a motor-propelled machine cease to be a motor vehicle because it moves in the upper strata of the atmosphere. We refer to motor boats and ships as the products of the marine-motor industry; to power-propelled cycles as having been built by the motor-cycle industry; the farm-tractor as the outcome of a rapidly developing agricultural motor industry. All these recognise that while they have each a separate identity, they are part of the great family of Motor, for which the motor industry is responsible. Even the hydroplane, which hovers between air and water, does not deny its parentage. Only the aerial motor vehicle claims to be something distinct, not even of the same ancestry.

Mr. Coatalen, who certainly ought to know, is reported to hold the view that there is really nothing much about the aero-engine for which it need feel indebted to the motor-engineer. I suggest, probably with less deference than I ought to show, that Mr. Coatalen would never have been the great aero-engine designer that he is unless he had first known all there was to know about a motor-car.

Of course, the aero-engine is different from the motor-car engine; so is the motor-launch engine, the motor-cycle engine, and the farm-tractor engine. Nevertheless, there are many underlying principles that are the same all round, and investigations into the design and material of one must sooner or later react more or less on the design and material of the others. I believe that even aero-engine manufacturers admit that they are learning things which will one day be quite useful to the motor engineer. Let us assume that they have now left this gentleman tagging hopelessly behind in his native mud while they soar into the blue skies. Even so, they cannot deny that the motor engine got home first, and that its existence suggested new and successful attempts to develop aerial locomotion.

The Evolution Theory.

Perhaps if I put my argument in a rather unusual form it will meet with more approbation. Let us say, then, that the motor industry is a part of the aircraft industry. The aircraft is capable of travelling in or on all the elements—earth, air, fire, and water. The motor vehicle or the motor boat has not got so far. It has limitations of the same kind that prevent the average human being from figuring successfully as an angel during his present existence. It is a kind of missing link, an earlier stage in the process of evolution. We may not want to accept the anthropoid ape as a second cousin, but science compels us to do so. Let the aircraft industry, then, in its graciousness, admit a somewhat similar but rather more degrading relationship to the common motor omnibus.

At the present moment it suits the industry to go its own way, after its own manner. It has deservingly secured a degree of public interest which is accorded to no other industry or branch of industry. Public opinion may well lead the Government to do for the Aircraft Industry what it will do for no one else.

Finally, then, we come to the conclusion that the fiction to the effect that the Aircraft and the Motor Industries are two totally distinct entities has merely been invented as a matter of policy and convenience. It is another way of saying that aircraft manufacturers do not like the only positions that are open to them in the Mede-and-Persian constitution of the S.M.M. and T. The fact of the matter is that we all realise at heart that the aircraft and the motor manufacturer are members of the same industry, but that it happens to suit the one to ignore his less exalted relative.—"Crawler."

The Production of Aeroplanes and their Components

(Twenty-Second Instalment.)

BY STEPNEY BLAKENEY.

TRACKING AIRSCREWS.

The airscrew can now be put onto the shaft, with its locking nut and locking washers, after which the screw should be tracked. This consists in making sure that the axis of each blade travels in precisely the same path as all the others. If it does not, then it means that the airscrew boss is not bedded correctly at right-angles to the shaft.

The work of setting this right must not be put in the hands of any except the most experienced erectors, otherwise the fault will easily be made considerably worse, or the airscrew scrapped. It is possible that the whole of the necessary alteration may be made by slackening out the bolts on the side opposite to the airscrew blade which requires bringing into the true track, and tightening up the side affected, or vice versa, according to the direction required.

The limits allowable for screw blades to be out of the true track may be assumed to be, at the most, $\frac{1}{8}$ in. Any further amount will require to receive special sanction, and should be reported to the head of the department concerned. Possibly it may be necessary to take the airscrew off the shaft, remove the boss from the screw, and check the sinking. It is then worth while to make sure that there is no roughness or raggedness at the edges of the bolt holes, for this would be quite sufficient to be the cause of the trouble.

PIPE TESTING.

Having dealt with the erecting and completing of the machine, the oil and petrol tanks should be filled up, and a careful test made to see that all pipe connections are correct, and that there are no leaks of any description.

It is quite possible that one or two pipe joints may require attention. Also, petrol and oil cocks sometimes require regrinding in, in which case a small tin of "grinding-in paste" will be useful, but extreme care must be taken to make sure that all traces of this paste are removed after grinding in a plug, or any valve.

TOUCHING UP.

Having completed erection, it will be necessary for the painters and polishers to come along and touch up the fittings which may have had the enamel damaged, or struts which may have become dulled, and to do any other polishing or incidental work necessary for the proper finishing off of the machine.

OVER-ALL INSPECTION.

The work on the machine having been completed, the works inspection department should be duly notified, and a couple of men sent to inspect the machine thoroughly all over, in detail. To save trouble and time, a good plan is for the inspectors to have a supply of small red "tie-on" labels, which can be tied onto any part of the machine requiring attention. They should write on the label the number and nature of the defect, so that when the erectors come to remedy any faults, the nature of the defect may at once be known to them by referring to the label.

After the defect has been remedied the label must be replaced on the previously defective or unfinished part, so that the inspector on his return can refer to his note-book and the number of the label and see that the defect has been remedied.

The use of this system enables another inspector to go through the whole machine, and this acts as a double check, as it is quite possible that some fault may be spotted which has hitherto remained hidden, and further, it causes the first inspector to be keener on his inspection, as he does not want the second man to notice defects which he himself has missed.

COMPASS CHECKING.

Assuming that the machine has been completed, the next thing to do is to arrange to adjust or check the compass.

To do this it is necessary to select a clean level part of the floor of the erecting shop, in a part sufficiently large all around to enable the machine, as erected for flying, and complete with all units, to be moved about. Failing this the machine must be taken into a field or aerodrome.

Having got the machine here, it is necessary to set out a line with fine twine which runs dead true between the north point and the south point, with the aid of a compass. The east and west must also be set out, and all the intermediate points of the compass, namely, E.N.E., E.S.E., W.S.W., W.N.W. Each of these lines of twine will intersect at the centre, and each line should be about 40 ft. long from end to end.

The machine should now be located in a central position, both longitudinally and transversely, over the line lying between the north and south points, and with the aid of plumb-lines from the centre of the airscrew shaft and the tail end of the fuselage, accurately located on this line. An examination of the compass in the machine must now be made, and the position of the compass accurately measured and noted.

The machine must now be turned round to the next point of the compass, namely, E.N.E., and the position of the needle again noted, together with any variation, this operation being repeated until all the positions and points of the compass have been thus checked. When these observations have been completed, it will be as well to plot the whole of them on paper and note the variations, if any, which exist between the true theoretic points of the compass as set out on the ground, over which the machine has been set, and its compass, and the actual readings observed on the compass in the machine.

By plotting the whole of the observations on paper, it will enable a decision to be arrived at, as to whether the compass is accurate, or whether allowances of so many degrees will have to be made when reading the machine's compass, or whether the compass will have to be changed owing to lack of sufficient accuracy.

If it is decided that the compass is sufficiently accurate for its purpose, then any allowances which have to be made, and are required in taking a reading from the compass, will be duly noted in the records of the machine.

[N.B.—In Service machines the compass is supplied by the Government, and the checking (or "swinging") is done at a Service aerodrome by Government officials who are supposed to be specialists in this science. Any necessary adjustments are made by them.—Ed.]

THE INCLINOMETER.

The inclinometer should also be checked. For this purpose the machine should be set up to the true theoretic level line of flight and the reading on the instrument duly noted, and any corrections necessary, due to position, made.

The cross level on the machine should also be tested, and for this purpose the fuselage of the machine must be set up dead level and the reading on the instrument duly noted, and any corrections due to position, which cause an incorrect reading, should be rectified.

The machine may now be considered finished and ready for handing over to the aerodrome, whence it will receive its final inspection and engine tests before being flown.

(Conclusion.)

[This is the end of this series of articles so far as Mr. Blakeney is concerned, but if any readers of the series would like further explanations of any particular points, Mr. Blakeney will be pleased to give such explanations in future issues of THE AEROPLANE. Readers are, therefore, cordially invited to write and ask for any further information which they would like to have concerning any details in the articles, about which they may not be quite clear.—Ed.]

A NEW APPOINTMENT.

His many friends in the Aircraft Industry will be interested to hear that Mr. M. H. Volk, formerly of Fred. Sage & Co., Ltd., Peterborough, has now taken up a more responsible position which was offered to him by an important firm on the South Coast now engaged on large Air Board contracts. Mr. Volk, who was trained as a marine engineer, will be remembered as chief engineer of the electric railway at Brighton. His keenness on aviation led him to put up a temporary seaplane station at Brighton which was at the disposal of all and sundry users of seaplanes for a period of two and a half years.

This station was not a commercial speculation, but was started purely in order to encourage the use of seaplanes, and it fulfilled an exceedingly useful purpose in introducing thousands of visitors at Brighton to the uses of seaplanes. The first Curtiss boat which came to this country did its trial trips there, and afterwards it was frequently used by naval seaplanes.

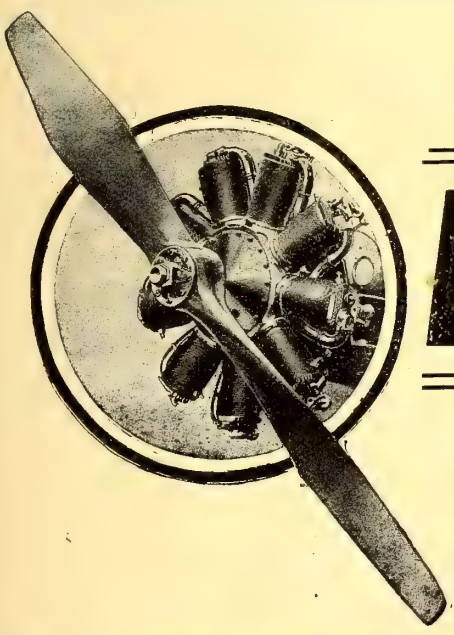
Soon after the outbreak of war Mr. Volk joined Fredk. Sage's, of Peterborough, as assistant to Mr. Gordon England, where as works manager and engineer he did much to set the standard of high quality in aircraft work which is now the outstanding feature of Sage aircraft. Not only did he do valuable work in this way, but he acquired very great personal popularity among the office staff and worshop hands alike at Peterborough. This is proved by the fact that on leaving Sage's he was entertained to a regular series of dinners by the staff and by the works superintendents and foremen, and on taking leave of the firm he was presented with a handsome silver cigarette box "As a token of regard from some of those who have worked with him."

Mr. Volk's engineering knowledge and his intense keenness on all things aeronautical should undoubtedly be of great value to his present firm.



ARMSTRONG, WHITWORTH
AIRCRAFT WORKS,
NEWCASTLE-UPON-TYNE.

TELEPHONE:- 500 GOSFORTH.
TELEGRAMS:- ARMSTRONG AVIATION,
NEWCASTLE-ON-TYNE.



AERO ENGINES

W. H. ALLEN, SON & CO. LTD.
QUEEN'S ENGINEERING WORKS, BEDFORD,
ENGLAND.

THE PATENTS INDEX.

The subjoined list of recent inventions has been specially compiled by THE AEROPLANE from the current Official Patents Records.

PATENT APPLICATIONS.

Avery, P. Shell for use against aircraft. No. 16115. Nov. 5th.
Bechereau, L. Means for driving propellers, etc., by several engines. No. 16158. Nov. 5th.
Berry, A. O. Propellers for aeroplanes. No. 16340. Nov. 8th.
Boyle, E. Aeroplanes. No. 16503. Nov. 10th.
Callender's Cable and Construction Co. Aerodrome lighting for landing of aircraft. No. 16439. Nov. 9th.
Caproni, G. Internal-combustion engines. No. 16364. Nov. 8th.
Davidson, S. G. Projection of explosive shells, bombs, etc., or flare-light shells. No. 16140. Nov. 5th.
Davis, W. H. Vertical or horizontal indicator for aircraft, ships, etc. No. 16424. Nov. 9th.
Gilbert, W. V. Propellers. No. 16484. Nov. 10th.
Hill, H. W. Sighting-apparatus for use against aircraft. No. 16192. Nov. 6th.
Hirsch, E. Air-raid shelter. No. 16458. Nov. 9th.
Howarth, F. H. Air propeller. No. 16387. Nov. 8th.
Jameson, J. Means for indicating position of a flying-machine relatively to a horizontal or vertical plane. No. 16412 Nov. 9th.
Jones, C. F. Airship. No. 16091. Nov. 5th.
Lobnitz, H. C. Screw propellers for aircraft, etc. No. 16325. Nov. 8th.
Lord, H. Glands or fairleads, etc., used in aerostats, etc. No. 16378. Nov. 8th.
Massey, R. Method of marine and air propulsion. No. 16406. Nov. 9th.
May, W. J. Apparatus for registering result of artillery fire by aerial observation, registering ground speed, and sighting bombs. No. 16445. Nov. 9th.
Nicholson, A. Aerial destroyer. No. 16101. Nov. 5th.
Pelterie, R. Esnault-. Aircraft. No. 16146. Nov. 5th.
Robinson, C. J. Aircraft, motor-cars, etc. No. 16176. Nov. 6th.
Rogers, L. V. Making buildings bomb-proof. No. 16193. Nov. 6th.
Royle, A. E. Marine ships and aircraft, and propulsion thereof. No. 16350. Nov. 8th.
Williams, J. I. Sectional frame construction for flying-machines, etc. No. 16392. Nov. 8th.

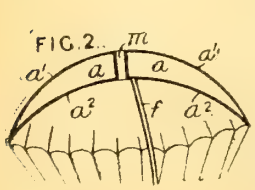
COMPLETE SPECIFICATIONS ACCEPTED, PRINTS OF WHICH CAN BE OBTAINED ON AND AFTER NOVEMBER 29TH, 1917.

110795. Nov. 1st, 1916. Sopwith Aviation Co., and Sopwith, T. Device for attachment of cables, wires, and the like upon aircraft.
110796. Nov. 2nd, 1916. Gwynnes, Ltd., and Humphreys, H. Means for attaching ignition wires to sparking-plugs of rotary aeroplane engines.
110797. Nov. 2nd, 1916. Wolseley Motors, and Remington, A. A. Means for returning to a tank, (sic) oil from bearings of internal-combustion engines, which in use are liable to be considerably tilted.
110798. Nov. 2nd, 1916. Walsh, F. F. P. Cell-forming units or elements for forming structures having internal cells or cavities.
110812. Nov. 18th, 1916. Low, A. M., Dickinson, J., and British Aircraft, Ltd. Framework of airships.
107574. June 29th, 1916. Guyet, H. R. Device for cooling the motors of aircraft.

ABRIDGMENTS OF RECENTLY PUBLISHED SPECIFICATIONS.

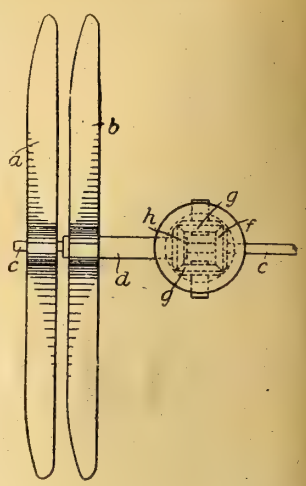
109,492. Aeronautics. WATERLOW, C. M., His Majesty's Airship Station, Wormwood Scrubbs, London. Sept. 20th, 1916, No. 13378. Drawings to Specification. [Class 4.]

AEROSTATS.—An aerostat comprises two side girders arranged in vertical planes or in planes slightly divergent upwards and extending for the greater part of the length of the airship, the depth of the girders approximately to or being slightly less than the depth of the aerostat. The girders are of lattice or cantilever construction designed to carry the gondolas and are connected together at the top and bottom so as to give a pentagonal cross-section or a section having a curved top. The aerostat may have its ends tapered longitudinally or it may be of streamline form.



109,496. Aeronautics. LONGMORE, A. E., 40, High Street, Birmingham, and TRUSSLER, F., 39, Park Road, Sutton Coldfield. Sept. 23rd, 1916, No. 13542. [Class 4.]

PARACHUTES.—A parachute normally carried on an aviator's back or by the top plane of an aeroplane comprises two layers of fabric forming a gas container which is adapted to be extended by gas from a compressed-gas cylinder or generator. Fig. 2 shows a cross-section of the parachute consisting of two layers of balloon silk a^1, a^2 forming a chamber a which communicates, through a non-return valve and tube f, with a source of supply of carbon dioxide, oxygen, hydrogen, or coal gas. The folded parachute may be carried in a light cover or fastening adapted to be burst by the extending gas-chamber. A passage m is provided at the centre of the parachute.



109,503. Aeronautics. MACLAREN, N. H. W., Deaseholm, Troon, Ayrshire. Sept. 30th, 1916, No. 13918. [Class 4.]

PROPELLING.—In an arrangement for driving two aircraft propellers in opposite directions, one propeller a is mounted on an engine shaft c, which carries a bevel-wheel f gearing by means of other wheels g with a wheel h secured to a sleeve d carrying the other propeller b.

Reference has been directed by the Comptroller to Specifications 12514/10 and 12099/11. [One recalls Mr. Howard Wright's similar invention shown at Olympia in 1909.—Ed.]

THE "AIRCRAFT RAG."

The November edition of the "Aircraft Rag," the magazine of the employees of the Aircraft Manufacturing Co., Ltd., is prefaced by a rather melancholy article, signed by the Editor of the Committee. The Editor of the "Rag" has been called upon to transfer his activities to another sphere of the firm's operations in the Provinces, which will make it impossible for him to carry on the somewhat responsible task of producing this very successful works magazine.

The Committee are resigning *en bloc* in order that the new editor, whoever he may be, may make a fresh start on his own, with a set of helpers selected by him. The retiring Editor and Committee call upon all the Aircraft Company's employees to continue loyally to support the "Rag" and the new editor and staff.

Those outsiders who have had the privilege of reading the "Aircraft Rag" month by month, will join the late Editor in this admonishment, because the "Aircraft Rag" is certainly in the front rank of works magazines which sell at a 1d., and it must do considerable good among the different factories and component departments under the control of the Aircraft Manufacturing Co., and its allied businesses.

The magazine continues to grow in size and in ambition, and if one can judge from the advertisements it contains from local tradesmen, it enjoys considerable confidence as a means of imparting information. One looks forward with interest to the December issue, which will be produced under the new regime, but it is really difficult to see how any important change in its make-up will constitute an improvement over the existing layout.

The circulation of the "Aircraft Rag" is not necessarily confined to Aircraft employees, and anyone interested is invited to subscribe, the subscription being 2s. per annum, post free. Subscriptions should be addressed to the Business Manager, The "Aircraft Rag," c/o The Aircraft Manufacturing Co., Ltd., The Hyde, Hendon, N.W.9.

"THE HIGHFLYER."

The November issue of "The Highflyer," the works magazine of the Norman Thompson Flight Co., Ltd., of Bognor, contains an announcement that a special Christmas number is in contemplation, and, as each shop and office belonging to the firm is especially invited to send at least one contribution, the result should be interesting.

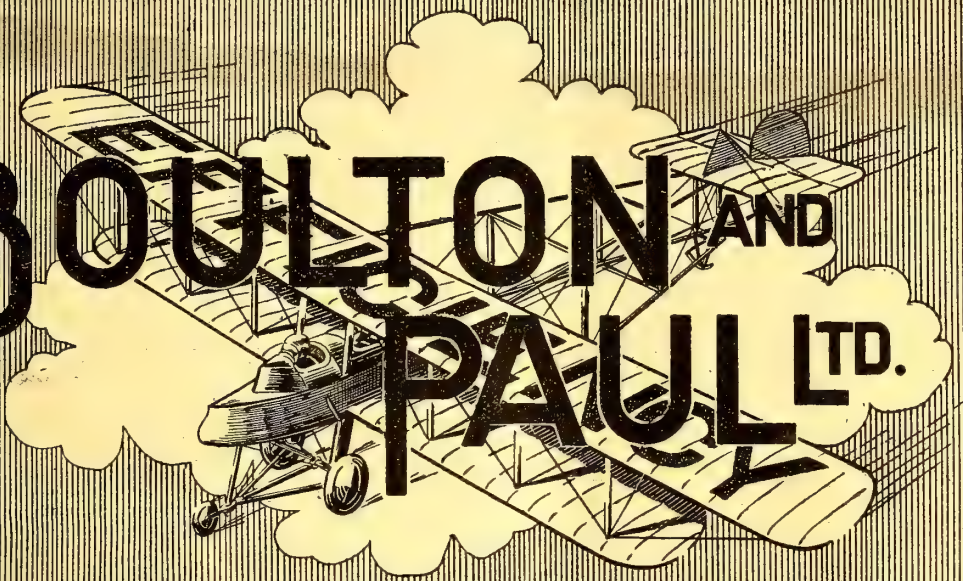
The current number consists mainly of verse, chiefly of a locally topical nature, and much of it inspired, apparently, by intimacy with the file and hacksaw.

Among other attractions is a double acrostic, for the solution of which a prize of 5s. is offered. The writer personally knows of less intellectual modes of profiteering, and, therefore, refrains from competing.

VACUUM UBIQUITY.

In view of the fact that Aircraft workers depend largely upon bread and beer for their sustenance it is not out of place to mention that Vacuum lubricant was used in all the motor ploughs which competed at the recent Scottish trials.

Telegrams "Aviation" Norwich. 'Phone No 851 Norwich



BOULTON AND PAUL LTD.

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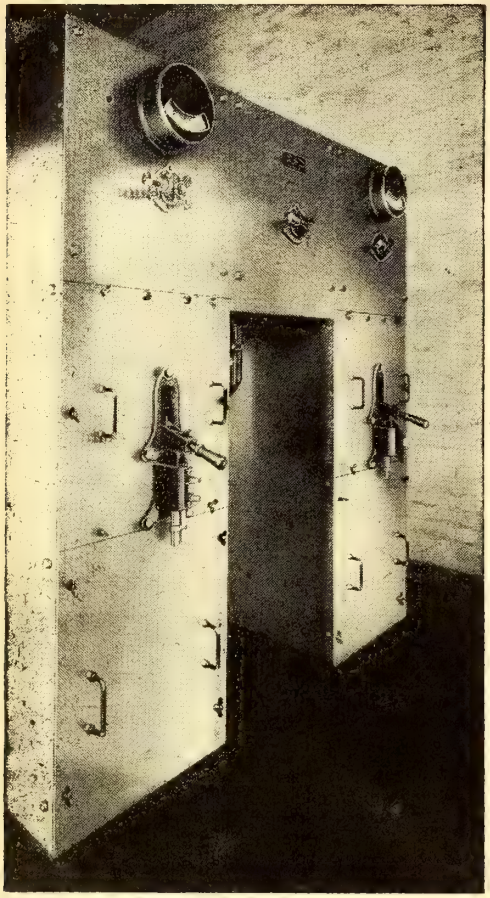
S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

WORKS & OFFICES: { CRISP ROAD, HAMMERSMITH, W.6. / CHURCH WHARF, CHISWICK, W.4. } LONDON.

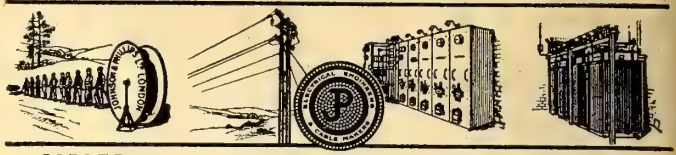
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TELEGRAMS: "GWYNNE, LONDON."

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THE AIRCRAFT TRADER

MARKET TOPICS.

Prices given are for quantities on usual terms.

Nov. 15th, 1917.

COPPER.—The U.S. authorities appear to be handling the control of Copper in a very businesslike manner. It is reported that a very influential committee, including prominent men in the Copper Industry, has been set up. This committee has already notified producers that they must submit to them a record of all Copper sold by them and still undelivered; buyers' names and prices to be shown. It is also understood that the committee is the only channel through which exports can be dispatched, and buyers of Copper for ordinary industrial purposes are missing, simply because they realise the impossibility of procuring metal. The committee are now conversant with the American and Allied Governments' future war requirements, and they are seeing that their demands are amply met before supplies are allowed to pass for other purposes.

The U.S.A. labour situation appears to be more satisfactory. One or two of the mines are reaching normal working conditions, although the Mexican position is anything but satisfactory. According to recent reports the Mexican authorities have notified one of the leading Copper companies that unless operations are resumed before the end of November, they will confiscate its property. It must be stated that in this instance there is no labour dispute, the dispute being between the authorities and the company over the imposition of taxes, and the latter closed down.

There is still a feeling that the official price in U.S.A. is too low, and it is quite possible this will be increased at the end of the four-month period.

Conditions here are just the same; supplies are fairly satisfactory and prices remain unchanged.

Comparative Prices.

To-day	£110	0	0	per ton.
November, 1916	126	10	0	per ton.
November, 1915,	77	7	6	per ton.

TIN.—Sellers are still holding back and prices are soaring to an unprecedented height. Shipments are still very uncertain. The whole position is very difficult indeed and there does not at present appear to be any likelihood of an improvement.

The stocks of Tin in America are very low. At the end of October the total was 1,657 tons, which is equivalent to about 10 days' consumption, taking the October figures as a basis.

Comparative Prices.

To-day, 15th	£269	0	0	per ton.
November 9th	267	0	0	per ton.
November 2nd	258	0	0	per ton.
October 1st	243	10	0	per ton.
Highest Price, October, 1916	205	0	0	pen ton.

LEAD.—There is nothing of importance to report; supplies are fairly satisfactory and prices remain unaltered. It is understood that the U.S. Government will fix the official price at about 6 cents, which equals about £28 10s. f.o.b., New York.

STEEL.—Although the supplies of Aircraft Steels are increasing at an appreciable rate the total output is far below the increasing consumption. It is, however, a pleasure to learn that more and more furnaces are being put down and there is good prospects of very substantial increases in output being effected.

A few weeks ago it was mentioned that there was a possibility of the situation being helped by good supplies of steel being purchased from America. There does not, however, appear to be any prospect of these expectations being fulfilled; the American Works apparently having refused to accept the lower prices which the Government were supposed to have fixed.

It is now practically settled that the advance in the price of coke will be 6s. 4d. per ton; this, together with the increase in wages, is bound sooner or later to affect the prices of all classes of Steels (see prices current).

TIMBER.—The recent arrivals of Mahogany have been fairly good, but very little Walnut has been received.

The Silver Spruce position does not improve; in fact, the more one thinks of the lethargic manner in which the problem has been handled since first the shortage became apparent, the more hopeless is the outlook upon the future, seeing that the demands will during the next few months be simply colossal.

It is still generally agreed that the A.I.D. inspection of wood parts, could without incurring the risk of getting "dud" parts in the machines, be considerably relaxed; this is particularly applicable to School machines.

The Air Board have now given constructors permission to use Satin Walnut, Picus, and Cedar three-ply, as long as it complies with their specification.

Prices continue very firm. It is, however, understood that the price of Silver Spruce substitutes will be less than the price ruling at present for Silver Spruce.

FABRIC.—The Irish labour troubles are still unsettled, although the strike has now been in progress nine weeks.

CURRENT MARKET PRICES.

Nov. 15th, 1917.

The prices given below are the prices ruling on the above date.
Terms.—Usual for the various materials mentioned.
Prices of old metals are as quoted by scrap dealers.
Prices must not be taken as specific quotations for definite quantities delivered to any part of the country.

Aluminium.*

Ingot	£225 per ton.
Remelted	£210 per ton.

Brass.

Sheets	15⅛d. per lb.
Strip	14⅝d. per lb.
Wire	14⅛d. per lb.
Tubes	15¾d. per lb.
Castings	15d. per lb.
Turning Rod	14d. per lb.
Brazed Tubes	19½d. per lb.

Copper.

Ingot, Standard, Cash	£110 per ton.*
Ingot, Standard, 3 mos.	£110 per ton.*
Best Selected (Nett)	£123 to £119 per ton.
Sheets	£150 per ton.
Wire	15½d. per lb.
Tubes, S.D.	18½d. per lb.
Tubes, Brazed	18½d. per lb.
Rivets	1s. 10½d. per lb., basis.
Tacks	1s. 10d. per lb.

Fabric.*

Linen, R.A.F., 17C, Spec., 36 in. wide, 2s. 8d. p. yd.
Linen, R.A.F., 17C, Spec., 38 in. wide, 2s. 9½d. p. yd.
Spaced, R.A.F., 17C, Spec., 37½ in. wide, 1s. 9d. p. yd.

Gun Metal.

Castings	1s. 8d. per lb.

Lead.

Virgin Pig	£29 per ton, c.i.f.
Virgin Pig	£30 per ton, ex stores.
Sheets	£39 10s. per ton, D/d.
Pipes	£40 per ton.
Dry White	£46 10s. per ton. less 5 per cent.
White in Oil	£53 per ton. (lots over 5 cwt. less 5 per. cent.)
White in Oil	£55 per ton. (lots under 5 cwt. less 5 per cent.)
Red	£42 per ton, less 2½ per cent.

Nickel.*

Nickel	£200 per ton.

Phosphor Bronze.

Ingots, 5 cwt., and under	£150 to £170 per ton. (Subject to Copper and Tin Fluctuations.)
Castings	1s. 7d. to 1s. 9d. per lb.

Phosphor Copper.

Ton lots	£200 to £205 per ton.

Silver.

Silver	43¾d. per oz.

Solder.

Plumber's	110s.
Tinman's	143s.

Steel.*

High Speed, 14 p. cent., Tungsten, 2s. 10d. per lb., basis.
High Speed, 18 per cent., Tungsten, 3s. 10d. per lb., basis.

ALLOY STEELS TO AIR BOARD SPECIFICATIONS.‡

Round and Square :—

Specification No. S2	£86
Specification No. S2 (bright-drawn)	£115
Specification No. S8	£86
Specification No. S10	£70
Specification No. S12	£75
Specification No. S14	£43
Specification No. S15	£70
Specification No. S16	£70
Specification No. S17	£75
Specification No. S18 (oil-hardened)	£86
Specification No. K1	£75
Specification No. K2	£75
Specification No. K3	£86

The above prices are for ¼ in. to 5/16 in. only, other sizes are proportionate.

HEXAGONS.

	.455 and .525	.601 and .710
Specification S2	£79	£77
Specification S8	£79	£77
Specification S2 (bright-drawn),	£112	£112
Specification S8 (bright-drawn),	£112	£112

SPELTER.

English f.o.b., Birmingham	£57

TIN.

Tin	£269

TINPLATES.*

Tinplate	30s., basis, f.o.t.

TIMBER.

Official.	Merchants.
Silver Spruce, 10s. 4d.	18s., c.f.
English Ash	16s., c.f.
Mahogany, 1s. 6d. to 1s. 10d.	2s. 2d. to 2s. 6d., s.f.
Walnut, 2s. to 2s. 3d.	2s. 3d. to 2s. 6d., s.f.

ZINC.

Zinc Sheets (American)	£110, f.o.b., New York.

SCRAP MATERIALS (LONDON PRICES).

ALUMINIUM.

Description.	Price per ton on sale to refiner, delivered at refinery.
Sheet cuttings and rods containing a minimum of 96 per cent. Al.	£160 0 0
Old rolled, etc., containing a minimum of 96 per cent. Al.	120 0 0
Spinnings, punchings, and thin small scrap; also painted and varnished scrap that needs melting, containing a minimum of 96 per cent. Al.	105 0 0
Lump scrap from aero castings and material of equivalent value, containing 87 to 95 per cent. Al.	100 0 0
Turnings and Swarf, generally containing 87 to 95 per cent. Al.	87 10 0
Scrap, generally containing 80 to 86 per cent. Al.	80 0 0
Swarf and inferior Swarf, generally containing 80—86 per cent. Al.	70 0 0
All Scrap, containing below 80 per cent. Al., not to exceed	65 0 0
All Swarf, containing below 80 per cent. Al., not to exceed	60 0 0
Brass, Heavy Selected	£88
Copper, Clean	100
Copper, Brazery	80
Gun Metal, Scrap	118
Lead, no Draft	26
Zinc, Old	40

*Official Prices.
†Includes Selection and Delivery.
‡Prices include Delivery in the U.K.

SMALL TOOL PROFITEERS.

The Ministry of Munitions dropped a "bomb" a few days ago amongst dealers in small tools. From November 15th new regulations will be enforced, respecting the importation of small tools except under a special licence. The speculation which has taken place in small tools for some time now has simply been atrocious, and the Ministry is apparently determined to put an end to it.

The schedule includes the following engineers', machinists', and woodworkers' small tools :—

Abrasive wheels.
Adjustable clamps, iron, steel or wood.
Auger bits.
Bandsaws.
Boring heads.
Callipers.
Chasers.
Chucks.
Circular saws for wood-cutting machines.
Diameter gauges.
Dies and die stocks.
Die heads.
Drill sleeves.
Drill sockets.
Emery-wheel dressers.
Expanding mandrels.
Expansion bits.
Files.
Furniture and dove-tail bits.
Gauges.
Hacksaw blades.
Hand and breast drills.
Hand-grinders.
Hide hammers.
Lathe carriers.
Lathe dogs.
Lead hammers.
Machine vices.
Micrometers.
Milling cutters.
Pipe cutters.
Pipe vices.
Pipe wrenches.
Pliers.
Punches.
Reamers.
Swage shapers.
Screwing tackle (i.e., chasers, dies and stocks).
Taps and thread milling cutters.
Tapping attachments.
Tool wrenches.
Tool-holders.
Tube expanders.
Verniers and rules and measuring tapes.
Wood-boring bits.

The special form of licence to be obtained by importers has not yet been made public, and it is, therefore, premature to comment upon the regulations.

It has been known that in many cases tools have passed through three or four hands before actually reaching the user; furthermore, new firms dealing in small tools have sprung up like mushrooms, and are nothing more nor less than "speculative war profiteers."

It is probable that the object of the regulations will be to regulate the profits of the dealers, and it would do no harm if they materially reduce the number of firms who will be allowed to handle small tools. The Aircraft Factories have received very careful attention from these undesirable and wretched speculators; needless to say, they have in a few instances received a warm reception. Their activities, however, have not been stopped, and they have taken advantage of the unwary.

The Ministry has apparently sounded their death-knell, and while first-class importers will not grumble, it is to be hoped the Ministry will not impede the flow of consignments to this country by repeating the system in vogue for obtaining release numbers for machine tools, the usual result of which is that it takes about one month to obtain permission to buy a machine.

"WELFARE."

Firms having foundries and metal works engaged on aircraft work are probably not aware that on and after December 1st they will be under statutory obligation to provide facilities in their works for the treatment of injuries sustained by their employees. Any employer having twenty-five or more persons employed must provide not less than one "first-aid" box for every 150 employees. If 500 or more persons are employed, an ambulance room must be provided and furnished with glazed sink with hot and cold water, couch, stretchers, dressings, bandages, splints, sterilising instruments; a table and an ambulance carriage must be available when required.

The room must be in charge of a qualified nurse or other person trained in first-aid. Where "first-aid" boxes are required, they must be under a responsible person.

The term "metal works" is, of course, very indefinite, and can be subject to a variety of interpretations.

Full particulars of what the "first-aid" boxes must contain, and other details of the Order, are contained in Order 1067, dated October 2nd, 1917, and firms are advised to apply for a copy to the Home Office, Welfare Department.

STANDARDISED PETROL GAUZE.

[The following notice has been received from the Air Board.]

Considerable trouble and delay has been experienced in obtaining a regular supply of petrol gauze, primarily due to the fact that aircraft contractors depended upon importation for the finer mesh required for this very important accessory of aeronautical engines, and it was found that a wide variety of mesh was called for by different manufacturers, although they required the mesh for similar purposes, and in some cases it was very difficult to justify distinction. For instance, the difference in the width of the aperture between 200 mesh gauze and 180 mesh gauze is only 1/10,000th of an inch.

There has been a tendency to call for meshes much finer than are justified by the conditions. This has resulted in the use of a gauze which is much more fragile than is necessary or desirable.

To overcome this difficulty, the Air Board took the leading manufacturers of wire cloth into consultation, and the Royal Aircraft Factory experts made certain experiments, which has resulted in a standardised gauze being agreed upon.

This will greatly facilitate manufacture, and will enable the material to be produced in Great Britain in adequate quantities to meet the demands from aircraft factories. The gauze will be known as "Air Board Standard Petrol Gauze," and all orders and enquiries should be sent to the Air Board Office, S. (E.A.) 5, Room 609, Strand, W.C.2.

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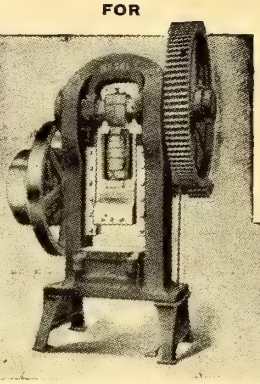
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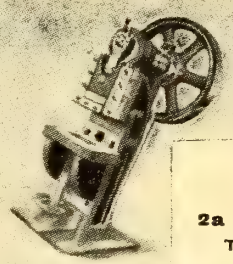
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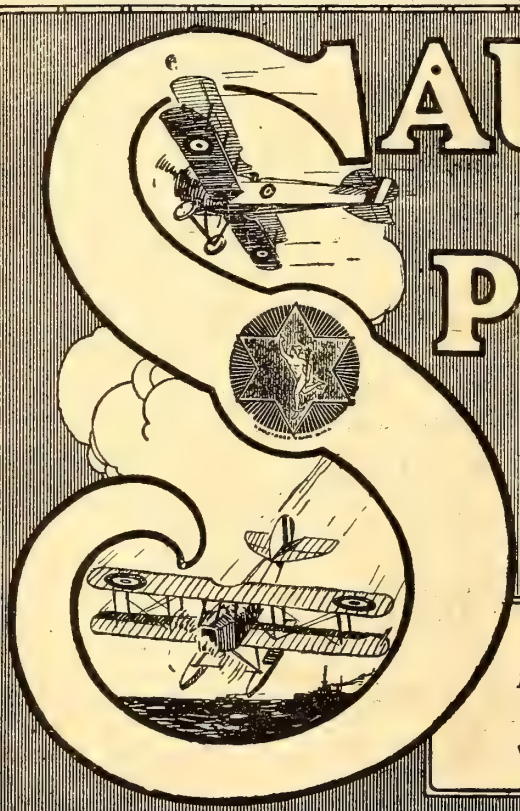
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AIRCRAFT FINANCE

CURRENT TOPICS.

Whitehead Aircraft (1917), Ltd.

Reference was made in these notes published Nov. 7th to the advertising campaign carried on by this concern intimating the early issue of a prospectus, offering shares to the public for subscription. Important details were published by The Aeroplane concerning the arrangements entered into between Mr. A. J. Whitehead and the company, which should give any investor contemplating investing his capital in the company reason to pause.

Advertisements still continue to appear from this company in the daily Press. To those with knowledge and experience in these matters, it would appear that the proceedings of this company require explanation in the interests of :—

(1) The industry;
(2) The general investing public; and
(3) The shareholders of the Whitehead Aircraft (1917), Ltd.

The advertisements issued by the company, which appeared in the Press on Nov. 3rd, stated :—

The Whitehead Aircraft (1917), Ltd., are "applying to the Treasury for permission to increase their capital," and they are to appeal to the British public to invest their savings in the enterprise.

I wrote in my previous article :—

That I should be very much astonished to learn that Treasury consent is ever granted to this company. The Treasury will probably regard very unfavourably the advertisements which the company have already issued, even if they do not altogether refuse the consent to any public issue, on the grounds of the arrangements between Mr. Whitehead and the company, as inimical to the interests of the shareholders.

In writing this paragraph I had in mind the view the Treasury hold in regard to anything being done in connection with new issues prior to their Lordships' consent having been granted. In fact, early in September of this year the Lords Commissioners of the Treasury issued a warning advising everyone concerned "that the regulations in force *forbid underwriting and the offering in participation in new issues until permission had been duly given.*" It may therefore be reasonably assumed that the Treasury will not grant permission to this company's issue, for one or other of the reasons I have set out.

Before, however, proceeding to criticise the methods of the company, I would ask Mr. Whitehead, in the interests we claim to represent, to be good enough to reply to the following questions : —

(1) *How many shares have been issued and allotted since the incorporation of this company on Sept. 7th, 1917, and*
(2) *Whether the subscribers to these shares have any knowledge of the existing arrangements* (a) under the terms of the articles of association between Mr. Whitehead and the company, and (b) of the private arrangements made to cover the cost of advertisinng and issue of shares?

Whitehead Aircraft (1917), Ltd., is a public company, consequently the information asked for is not private, and will in due course have to be filed at Somerset House.

Income Tax Regulations.

A question of particular interest to the aeroplane industry is raised by "Technical," who writes to inquire whether sums received by him in the following circumstances are assessable for Income Tax. "Technical" is an engineer by profession, and in the course of his work discovered a process which he duly protected in the ordinary way by taking out British and foreign patents. A company was subsequently formed, to whom he sold the British rights. Since then he has sold to other groups his rights in several foreign countries.

In the circumstances, these are "casual profits" in the terms of the Act, and as such are not assessable. No liability attaches for income tax from "casual profits," as Section 2 of the 1853 Act limits assessability to "annual profits" (i.e., the converse of "casual profits"), and, moreover, it only charges annual profits derived from any "profession, trade, employment, or vocation," or from "any kind of property." The profits in question must, in order to give assessability, be (a) annual profits of an employment or business, or (b) annual profits from property.

Now, if he is to come under (a), "Technical" would have to be carrying on a trade or business of taking out and exploiting or selling patents, and the case in question is clearly not within this requirement if, as is the case, "Technical" is engaged in a distinct occupation or business, and in no way makes a connected business of patents. Any profit derived from the sale of an isolated patent is in respect of a casual transaction, not of the nature of annual profits of an employment or business. The fact of the rights being split and sold to different persons is irrelevant, as it does not by this fact become "annual trading." If the profits were assessable there would be no meaning in the word "annual" consistently inserted in the Acts.

As regards the assessment of annual profits from "any kind of property," the profit on a sale outright of the capital assets cannot be "annual profits" from property. Moreover, there is no distinction between the patent rights and (e.g.) stocks and shares, and it was held in Californian Copper Syndicate v. Harris that "it is quite a settled principle in dealing with questions of assessment of income tax that, where the owner of an ordinary investment chooses to realise it, the enhanced price is not profit in the sense of Schedule D"; and, in Hudson's Bay Co. v. Stevens, it was ruled that "the real question is whether this money can be regarded as profits or gains derived from carrying on a trade or business." The Master of the Rolls also stated that he was "unable to attach any weight to the circumstance that large sales are made every year."

It will thus be seen that all such cases are against assessment.

The Bleriot Aircraft Manufacturing Co., Ltd. (in liquidation).

In these columns, under date of Oct. 10th, a full detailed account of a meeting of shareholders of this company, held at the Cannon Street Hotel, was given, the meeting having been convened by the well-known solicitors, Messrs. Amery, Parkes, and Co.

The only motive in giving publicity to the proceedings was in the hope that something would result for the benefit of the large number of shareholders who were unfortunate enough to have been induced to subscribe for shares in this company on the original prospectus. Since the publication of these comments a mass of further information has reached me, which proves without doubt that there is another side to the story.

Out of the £100,000 which the public subscribed, the promoting group, as the first act, mulcted the company in no less than £30,000 under the various contracts which had been entered into between the promoting syndicate (of which Mr. H. J. Lawson was chairman) and the company, of which only a very small amount ever reached the original vendor.

An examination of the whole of the details compels the view that the shareholders, by the timely action of the Official Receiver, were fortunate in being able to save so much of the original capital they had subscribed, and with a further knowledge of the early manipulations and history of the promotion one is forced to the conclusion that the shareholders would be well advised to leave their interests in the company in the safe and competent hand—of the Official Liquidator.—G. A.

COMPANIES' PROCEEDINGS.

Sunbeam Motor Car Co., Ltd.

The notice convening the ordinary general meeting of the company to be held at Wolverhampton on the 27th inst. is accompanied with a statement made by the directors that the amounts payable for excess profits duty and special taxation in respect of the profits earned to August 31st, 1916, have not yet been ascertained, and they are therefore still unable to submit to the shareholders complete accounts for the year ending at that date. For a similar reason the accounts for the year just ended cannot be presented.

The directors, however, are satisfied that the profits which will be ultimately available justify them in recommending a dividend of 10 per cent., tax free, for the year, also a bonus of 1s. per share on the ordinary shares, tax free. For 1915-16 the total distribution was 30 per cent.

The immediate announcement of the reduced dividend naturally caused a temporary set-back in the quotation for the shares. No doubt some satisfactory explanation will be forthcoming from the directors at the annual meeting.

S. SMITH AND SONS (MOTOR ACCESSORIES), LTD.

The meeting of the company was held on Thursday last, the 15th inst. Mr. Samuel Smith, the chairman, who presided, in moving the adoption of the report, expressed regret that the Board were unable to present accounts for the year under review owing to difficulties in connection with the Munitions Act and the Finance Act of 1916-17. For the year ending July, 1916, the turnover had reached £396,412, whereas for the year under review the figure had reached £746,899.

The ratio of profit had not been maintained, but when the accounts came before them he thought the shareholders would be satisfied that owing to the largely increased turnover the company had a satisfactory year's training. He and his family were large shareholders in the company, and it was in the future even more than in the present that he had faith. The large business of which the shareholders were proprietors had been built up out of a long-established concern originally engaged in the production of scientific instruments.

Since war the board, besides considering the present, had had an eye on the future, and considering that no company was better placed to engage in the production of aeroplane accessories than themselves, and believing that in the future such a department would have as large, if not larger, possibilities than the department for motor accessories, they had acquired during the past year some exceedingly valuable inventions used in the equipment of aeroplanes. Orders for aeroplane instruments and accessories were already increasing by leaps and bounds, and they looked upon the department not as a war-time branch, but as one that had come to stay. Indeed, the company was already the largest manufacturer of aeroplane instruments and accessories in this country to-day.

To secure the future in that direction they had engaged the services of aeronautical engineers of proved ability, and had acquired the goodwill and business of one of the leading inventors and manufacturers. Their premises had been considerably enlarged, and they had acquired the business and patents of the Trier-Martin Dynamo, so that they would be in the position in future to manufacture without paying intermediate profits and royalties. A new carburettor had been introduced by the company's engineers, which had proved itself equal to the original and highly-successful model known as the Smith carburettor.

The report was adopted, and the meeting stood adjourned until such time as the accounts of the year could be presented. The final dividend of the year, 1s. 3d. per share, free of tax, making, with the interim dividend already paid, 10 per cent. for the year.

The sum of 100 guineas was unanimously voted to war charities.

The notice to the shareholders notifies the closing of the transfer books and register of members from the 15th to the 23rd inst. for the preparation of dividend warrants for the year ending July 31st, 1917, which are to be posted to the shareholders on November 23rd.

REVIEW OF THE STOCK AND SHARE MARKET.

Dealings in the Stocks and Shares of Aircraft and allied companies have been more than usually interesting during the past week. The outstanding feature was the introduction on the Stock Exchange of the new "B" Pref. shares of the Aircraft Manufacturing Company, recently issued, which were dealt in at a premium. These £1 shares were issued at 21s., are now 11s. paid, and changed hands at 13s., thus confirming the view expressed in these columns that they would at once go to a premium. Another feature was the relapse in the quotation of Sunbeam Motor shares in consequence of the reduced dividend. The quotation at one time being marked down from 88s. to 82s. at the time of going to Press they are quoted 83s.-84s., whilst Rudge-Whitworth shows a considerable rise on the week from 42s. to 48s. Darracqs are now quoted ex the dividend and the bonus.

NEW COMPANIES REGISTERED.

The files of the following new companies registered with the nominal capitals of £5,000 and upwards are now available for inspection at Somerset House.

AZ-NU ENGINEERING CO., LTD.—November 15th, £12,000 in 10,000 Pref. and 2,000 Ord. shares of £1 each. 261, Church Road, Mitcham.

DEBENTURE AND MORTGAGE CHARGES.

GRAHAME-WHITE AVIATION CO., LTD. (late Grahame-White, Blériot, and Maxim, Ltd.), London, N.W.—Debenture Registered, October 18th; £20,000 ranking pari passu with debenture dated February 23rd, 1917; charged on the company's interest in certain leases, also a general charge; also debentures Registered October 30th, £80,000 to Minister of Munitions; charged on the company's interest and rights under certain contracts with Minister of Munitions.

KINGSBURY AVIATION CO., LTD., London, W.—Mortgage Registered November 2nd, £20,000 to Minister of Munitions; charged on freehold hereditaments and premises at Kingsbury, also a general charge.

STOCK EXCHANGE NOTICE.

Applications have been made to the Stock Exchange Committee to appoint special Settling days in:—

TRIPLEX SAFETY GLASS CO., LTD.—9,016 additional shares of £1 each, fully-paid, Nos. 50,985 to 60,000.

ANSWERS TO CORRESPONDENTS.

A Financial Specialist will be pleased to answer in these columns inquiries on any subject affecting or relating to Investments, Stocks, Shares and Securities of Aircraft and kindred companies, free of charge.

"MEDIA."—The mortgage deed itself should define the point you raise, it cannot be a question of opinion, but one of fact.

"ENCLAIR."—The Sopwith Aviation Co., Ltd., was incorporated, October 18th; £20,000 ranking *pari passu* with debentures as a private company. The Directors have power under the Memorandum and Articles of Association to decline transfers of the company's shares without assigning any reason for their refusal. The Chairman is Mr. Thomas Octave Murdoch Sopwith.

"W. A. B."—Many thanks for your flattering remarks, pleased to learn that the information given was satisfactory. Your suggestion is under consideration.

"DIRECTOR."—During the committee stage of the Finance Bill in the House of Commons, the Chancellor of the Exchequer passed a short "Amending Act" giving Directors of Limited Companies power to invest the funds of Companies in Government War Loans, notwithstanding any restrictive clauses contained in the Company's Memorandum and Articles of Association. There is consequently no obligation upon you to consult shareholders. The "Amending Act" fully covers and protects you

G. A.

A KEY INDUSTRY.

Mr. H. J. Mackinder, M.P., presiding on Nov. 16th at the London School of Economics over a lecture delivered by Mr. S. J. Johnstone on the "Rarer Key Minerals," said that in the future the rarer metals were bound to become of crucial importance to the industries of this country. Mr. Johnstone said the outbreak of war found Great Britain in a somewhat serious position in regard to the rarer elements, the most important of which was tungsten. At least 90 per cent. of this ore was used in the steel industry. Before the war very little tungsten was smelted in this country; most of it was sent to Germany, the controlling factor in the smelting market. Shortly after the war began, however, Sheffield gave its attention to the industry, but a South Midland town, which then possessed one small factory, increased its capacity, and now advertised itself as the largest producer of tungsten in the world.

CURRENT SHARE QUOTATIONS.

The following are the share quotations made up to Tuesday morning in each week of the principal companies engaged in the Aircraft Industry and Kindred Trades.

Aircraft Mnfg. Co.	7% cum. pref. £1 ...	24-	25/-
	7% cum. & ptg. "B" pref., 11/- paid ...	12/9	13/3
Armstrong (Sir W. G.) Whitworth & Co., Ltd.	4% cum. pref. £5...	3⅛	3⅜
	5% 2nd. pref. £1 ...	17/-	18/-
	£1 ordinary	40/6	41/6
Austin Motor Co., Ltd.	7% cum. pref. £1...	18/-	19/-
	£1 ordinary	25/-	26/-
Birmingham Small Arms Co., Ltd.	£1 ordinary	54/-	55/- x
	5% cum. "A" pref.	4⅛	4⅜
	6% cum. "B" pref.	19/-	20/- x
Boulton & Paul, Ltd., 5% cum. pref. £1		⅜	⅞
Brown Bros., Ltd., 6% cum. pref. £5...		4⅛	4⅜
Darracq (A) & Co., (1905) Ltd.	£1 ordinary ...	37/-	38/- x
	7% cum. pref. £1...	23/-	24/- x
Electric Construction Co., Ltd.	7% cum. pref. £1 ...	19/-	20 -
	£1 ordinary	23/-	24/-
Fellows Magneto Co., 8% cum. partip. pref.		16/-	17/-
General Electric Co., Ltd.	6% cum. pref. £10	10-5/16	10-7/16
	£10 ordinary	19	19¼
Gwynnes, Ltd., 5% cum. pref.		91/-	92/-
Ordinary		8/3	8/6
Greenwood & Batley, Ltd., £10 ordinary		9¾	10
Humber, Ltd., 6% cum. pref. £1		17/-	18/-
£1 ordinary		17/-	18/-
Napier (D) & Son, Ltd., 7½% cum. pf. £1		18/-	19/-
Peter Hooker, Ltd., £1 7% cum. partic. 1st pref.		19 6	20/-
Rolls Royce, Ltd., £1 ordinary		62/-	63/-
Rudge Whitworth, Ltd. £1 ordinary ...		47/-	48/-
Ruston, Proctor & Co., Ltd.	£1 ordinary	26/-	27/-
	5% cum. pref. £1 ...	17/-	17/6
Sunbeam Motor Car Co., Ltd., £1 ord...		83/-	84/-
Straker Squire, Ltd. (1913), £1 ordinary		23/-	24/-
S. Smith & Son, Ltd. (Motor Accessories) £1 ordinary		26/-	27/-
Triplex Safety Glass, £1 ordinary... ...		21/-	22/
Vickers, Ltd., 5% pref. stock...		78	82
5% pref. shares. £1 ...		17/-	18/-
£1 ordinary		39/-	40/-
Wm. Beardmore & Co., Ltd., 6% c. pf. £1		19/-	19/6

GENERAL INFORMATION.

Armstrong, Whitworth (1916).
Austin Motor (1916).
B'ham. Small Arms (1915-16).
Rolls Royce.
Rudge Whitworth.
Straker-Squire (1915).
Sunbeam Motor.
Thorneycroft (J. I.) & Co.
Vickers (1915 and 1916).

Owing to the difficulty of estimating liabilities under Finance and Munitions Acts, the accounts will not be ready until a later date.

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(*Continued from page* 1490.)

withstanding the fact that he had only returned a few hours previously from a successful action with hostile aircraft in superior numbers. He has always displayed remarkable skill and courage.

Act. Flt. Comdr. P. S. Fisher, D.S.C., R.N.A.S.

For conspicuous gallantry and devotion to duty in air flights and bombing raids. On one occasion, when very heavy fighting took place between eight machines of his squadron and about 20 Albatros scouts, he fought at least six combats single-handed, shooting down one of his opponents out of control. On another occasion, when he was acting as leader of a flight of five machines detailed for an offensive patrol, a general action took place with a number of Albatros scouts, in the course of which Act. Flt. Comdr. Fisher was wounded whilst fighting with great gallantry. He has shown himself to be a most efficient and plucky flight leader, and has also taken part in numerous night bombing raids in addition to his day fighting.

DISTINGUISHED SERVICE CROSS.

Flt. Comdr. G. E. Hervey, R.N.A.S.

For conspicuous gallantry and devotion to duty in air fights and bombing raids. On August 22nd, 1917, he attacked a formation of 10 hostile aircraft engaged in a raid on England, and brought one of them down into the sea.

Act. Flt. Comdr. H. G. Holden, R.N.A.S.

In recognition of the great courage and gallantry displayed by him in obtaining important photographs under heavy anti-aircraft fire on Oct. 14th, 1917, and on other occasions. He has also on many occasions been the pilot of spotting machines.

Flt. Sub-Lt. (now Flt. Lt.) V. R. Gibbs, R.N.A.S.

For conspicuous gallantry and devotion to duty in numerous night bombing raids, particularly on the night of Sept. 25th, 1917, when in spite of difficult weather conditions he carried out a double trip and made good shooting from 3,000 ft. and below, and was responsible for dropping over 1½ tons of bombs on his objectives.

Flt. Sub-Lt. (now Flt. Lt.) L. H. Slatter, R.N.A.S.

For conspicuous gal'antry and skill on many occasions both as observer and pilot. He has taken part in numerous night bombing raids, and on one occasion he ascended at night for the purpose of attacking hostile machines, notwithstanding the fact that he had only returned a few hours previously from a successful action with hostile aircraft in superior numbers. On Sept. 4th, 1917, he attacked an enemy torpedo boat destroyer with machine gun fire.

Flt. Sub-Lt. S. W. Rosevear, R.N.A.S.

For conspicuous gallantry and devotion to duty. He has destroyed several hostile machines, and has also attacked and scattered parties of enemy infantry from low altitudes, on one occasion from a height of only 100 ft.

Flt. Sub-Lt. F. R. Johnson, R.N.A.S.

For conspicuous gallantry and devotion to duty in a bombing raid on Thourout Railway Station on the night of Sept. 20th-21st, 1917, when he came down to about 3,000 ft. and made particularly good shooting.

DISTINGUISHED SERVICE MEDAL.

Air Mech., 1st Gr., T. R. Barber, O.N. F3771.
Air Mech., 1st Gr., L. G. S. Boshier, O.N. 15936 (Po.).
A.C., 1st Cl., G. Conley, O.N. F16254.
Act. Air Mech., 1st Gr., C. Spikins, O.N. F8732.

* * *

The following Officers and man have been mentioned in dispatches :—

Flt. Comdr. A. S. Douglas, R.N.A.S.
Lt. M. W. W. Cross, R.N.V.R.
Flt. Lt. B. D. Hobbs, D.S.O., D.S.C., R.N.A.S.
Flt. Sub-Lt. E. V. Reid, D.S.C., R.N.A.S. (since killed).
Air Mech., 2nd Gr., H. M. Davies, O.N. F20254.

* * *

The following decoration is conferred by the King of Italy for distinguished services rendered during the war :—

BRONZE MEDAL FOR MILITARY VALOUR.

Flt. Comdr. A. Q. Cooper, R.N.A.S.

The King has given unrestricted permission to the officer named to wear the Decoration in question.

SPECIAL PROMOTION FOR SERVICES IN ACTION.
R.N.A.S.

Act. Flt. Comdr. R. Graham to be Flt. Comdr. Dated Oct. 20th.

WAR OFFICE, Nov. 17th.

REGULAR FORCES—ESTABLISHMENTS.—R.F.C.—MIL. WING.—Brig.-Gen., R.F.C. Staff.—Graded as a Brig.-Comdr.—Maj. (temp. Lt.-Col.) J. G. Hearson, D.S.O., R.E., a Wing Comdr., and to be temp. Brig.-Gen. while so empld., vice Maj. (temp. Brig.-Gen.) G. Livingston, C.M.G., Lond. R., T.F. Oct. 28th.

Flt. Comdr.—Temp. Lt. F. Nuttall, Gen. List, from a Flying Officer, and to be temp. Capt. while so empld., Oct. 7th.

Equipmt. Officers, 1st Cl.—From the 2nd Cl., and to be temp. Capts. while so empld :—Lt. J. V. Read, Spec. Res. ; temp. Lt. C. K. Shepherd, Gen. List, Nov. 1st. Temp. Lt. T. G. Gordon, Gen. List, Nov. 10th.

WAR OFFICE, Nov. 19th.

REGULAR FORCES—ESTABLISHMENTS.—R.F.C.—MIL. WING.—Flt. Comdrs.—Temp. L. R. A. Birkbeck, Gen. List, from a Flying Officer, and to be temp. Capt. whilst so empld., Nov. 3rd ; Lt. (temp. Maj.) E. O. Grenfell, M.C., R.A., to revert from a Sqdn.-Comdr., to relinquish his temp. rank and to be temp. Capt. whilst so empld., Oct. 29th, seny. Flt. Comdr. from Sept. 5th, 1915.

Equipment Officers, 1st Cl.—From the 2nd Cl., and to be temp. Capts. whilst so empld. :—Sec. Lt. (temp. Lt.) W. T. Hanson, Spec. Res., Oct. 11th ; Lt. F. W. H. Lerwill, Spec. Res., Nov. 8th.

OVERSEA CONTINGENT.—CANADA.—CAN. CAV.—Temp. Lt. W. A. Bishop, V.C., D.S.O., M.C., is secd. for duty with the R.F.C. Nov. 15th, 1916 (substituted for "Gazette" notification, Oct. 26th, page 11,021, incorrectly describing rank as actg. Maj.).

* * *

The King has been pleased to confer the Military Cross upon the following officers for gallantry and distinguished service in the field. The acts of gallantry for which the decorations have been awarded will be announced in the "Gazette" as early as practicable :—

Sec. Lt. (Temp. Capt.) G. L. Lloyd, Yeo. and R.F.C.

CANADIAN FORCE.

Lt. W. B. Ferguson, Can. Rail. Troops and R.F.C.

* * *

The King has been pleased to approve of the award of the Distinguished Conduct Medal to the following non-commissioned officer and man for acts of gallantry and devotion to duty in the field, and a statement of services rendered will be published when practicable :—

2105 Sjt. S. T. Clinch, R.F.C. (E. Ham, London, E.).
94311 2nd Cl. Air Mech. W. Walker, R.F.C. (Hull).

FROM THE COURT CIRCULAR.

BUCKINGHAM PALACE, Nov. 14th.

The following officers had the honour of being received by the King, when His Majesty invested them with the Insignia of Companions of the Order into which they have been admitted :—

THE DISTINGUISHED SERVICE ORDER AND BAR TO THE DISTINGUISHED SERVICE CROSS.

Flt.-Comdr. Ronald Graham, R.N.A.S.

THE DISTINGUISHED SERVICE ORDER AND THE DISTINGUISHED SERVICE CROSS.

Sqdn.-Comdr. Bertram Bell, R.N.A.S.

DISTINGUISHED SERVICE ORDER.

Capt. Wedgwood Benn, Yeomanry, attd. R.N.A.S.

The King then conferred decorations as follows :—

THE DISTINGUISHED SERVICE CROSS AND BAR.

Flt.-Comdr. Richard Minifie, R.N.A.S.

THE DISTINGUISHED SERVICE CROSS.

Flt.-Comdr. Cecil Darley, R.N.A.S.
Flt.-Comdr. John Wheelwright, R.N.A.S.
Flt.-Lt. Douglas Nelles, R.N.A.S.
Flt.-Lt. Leonard Slatter, R.N.A.S.
Flt.- Sub-Lt. Edward Barker, R.N.A.S.
Flt. Sub-Lt. John Wright, R.N.A.S.
Observer Sub-Lt. Paul Bewsher, R.N.A.S.
Flt. Sub-Lt. Stanley Rosevear, R.N.A.S.

MILITARY CROSS AND BAR.

Capt. H. Luchford, R.F.C.

THE MILITARY CROSS.

Lt. Royland Harkus, K.O.S.B., attd. R.F.C.
Capt. Alexander Roulstone, R.F.C.
Lt. Montague Wyatt, The Buffs, attd. R.F.C.

NAVAL.

The following appointments have been made in the Royal Naval Air Service :—

Nov. 13th.—Actg. Lt.—H.R.H. Prince Albert, K.G., to Cranwell Air Station for executive duties, Nov. 12th.

Nov. 14th.—Lt. (temp. R.N.V.R.).—E. Willis, entered as Flt. Comdr. (temp.), seny. Nov. 7th.

Mr. E. C. Shackle, granted temp. comm. as Lt., R.N.V.R., seny. Nov. 19th.

Nov. 17th.—Tempy. commns. (R.N.V.R.) have been granted to the following :—Lt.—F. F. Stanley-Smith, Nov. 21st.

Nov. 19th.—Lieut., R.N.V.R. (Temp.).—L. A. Hooks, transferred to R.N.A.S. as Proby. Flt. Officer (temp.), seny. Nov. 17th.

ADMIRALTY COMMUNIQUÉS.

Nov. 13th.—On the afternoon of November 12th, naval aircraft carried out a bombing raid on Vlisseghem aerodrome (north-east of Ostend). Several bombs were dropped on objective. Visibility was fair only owing to haze.

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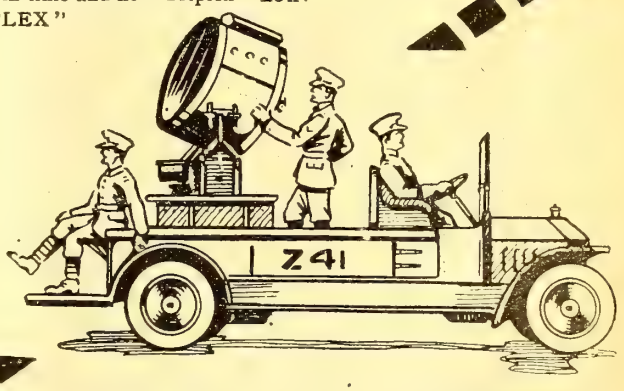
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During patrols which have been carried out several engagements with enemy aircraft have taken place, in which one hostile scout was shot down in flames.

All our machines returned safely.

Nov. 14th.—During Nov. 13th numerous patrols were carried out by the Royal Naval Air Service, several engagements with enemy machines taking place. One hostile machine was destroyed and three others driven down completely out of control.

A bombing raid was also carried out on Houttave aerodrome. Many bombs were dropped with good effect, a direct hit being reported on sheds.

All our machines returned safely.

Nov. 16th.—During Nov. 15th a bombing raid was attempted by naval aircraft on Uytkerke aerodrome, but owing to very high winds our formation did not proceed to its original objective, but dropped a large number of bombs on aeroplane sheds near Handzaeme.

In the course of offensive patrols two enemy aircraft have been destroyed and two driven down completely out of control.

All machines have returned safely.

Official Communiqués.

The Press Bureau issued the following on Nov. 17th :—

In the recent (sic) air raids on Gallipoli and Constantinople the R.N.A.S. had the assistance of a Greek naval unit, and during the five nights when the raids were in progress some very satisfactory results were achieved.

The Gallipoli Peninsula was bombed both by day and by night, the objectives including warehouses, aerodromes, a seaplane base at Nagara, and a Turkish camp near Bulair. All the Greek machines returned safely except one, which contained Sub-Lt. Chalkias and Observer Lazaris. These officers are, unfortunately, missing.

At Constantinople our machines, in spite of heavy anti-aircraft fire, dropped to a height of 800 ft. to attack the "Goeben." The first salvo of four bombs missed the ship, but hit some submarines and destroyers moored alongside her. The second salvo hit the "Goeben" a little forward of amidships, causing a large explosion and a big conflagration. Our machines then bombed the "General," in which the German Headquarters at Constantinople are reported to be situated. Bombs were dropped from a height of 1,300 ft., and two direct hits were secured on the stern of the ship. The next object of attack was the War Office, on which two direct hits were observed in the centre of the building.

The Turkish Minister at Berne has made a statement in reference to these air attacks, in which he acknowledges that the War Office at Constantinople and a destroyer were hit, "a certain amount of damage" being done.

The following honours have been awarded by his Majesty to the Greek officers engaged in these operations :—Lt.-Comdr. Moraitinis, D.S.O. ; Sub-Lt. Meletopoulos, D.S.C. ; Sub-Lt. Constantinou, D.S.C.

Of the British officers and men, Sqdn. Comdr. K. S. Savory has received a bar to the D.S.O. ; Flt. Lt. H. Maclelland and Lt. P. T. Rawlings, R.N.V.R., have received the D.S.C. ; and Chief Petty Officer J. L. Adams and Leading Mechanic B. Cromack has received the D.S.M.

* * *

An official review was issued on Nov. 17th of the work done by naval aviators in retaliating against the German raiders who have struck at London and the coast towns of Britain.

This recalls the occasion at the end of September when 15 Gothas, bound, it is believed, for London and the East Coast, were found by our aviators drawn up ready for flight, in the aerodrome of St. Denis Westrem. The aviators bombed the formation, and obtained a direct hit, with the result that London was not molested that night. In addition, the aerodrome itself was so damaged that some days must have been occupied in repairing it, and it is even possible that the enemy raiders were forced to set out from another base on the following nights. [It would be interesting to know whether any town in France was raided instead of London on that night.—Ed.]

During one month 38 raids were carried out by the Royal Naval Air Service on enemy aerodromes, which received 50 tons of explosives. Our aviators bombed St. Denis Westrem six times, Thourout 10 times, and in the same month 10 other aerodromes were each bombed from two to four times. The aviators often flew low enough to direct machine-gun fire on the personnel of the aerodromes.

The Royal Naval Air Service also attacks German railheads, dumps, camps, and stores. The enemy's communications are therefore disintegrated. During the month under notice 10 important termini were bombed 30 times in separate raids. Ten of these blows fell on Bruges and four on the docks and works at Ostend and Zeebrugge. About 30 tons of explosives have been dropped in these expeditions against the enemy's military works and concentrations. In this way the most mobile force we have is used, if not to cut the German lines of communication, at least to interrupt them.

[All the work described is, properly speaking, military work, and not in any way the concern of the Navy.—Ed.]

It has been definitely promised that as soon as possible there will be raids into Germany as reprisals ; indeed, successful bombing expeditions against the nearer manufacturing districts of Germany have already been carried out. The Royal Naval Air Service has taken part in these raids with good results. The targets were munition centres working at high pressure—Kaiserslautern, Saarbrücken, and the factory and railways round about them.

[As a military act these raids are desirable, if properly organised and carried out, but they are not reprisals. Saarbrücken is no more in Germany than Dublin is in England.—Ed.]

The Casualty List.

Reported Nov. 15th.

Accidentally Killed.—Kerr, Flt. Sub-Lt. D. R., R.N.
Andrews, Flt. Sub-Lt. E. O. A., R.N.
Died of Injuries.—Clive, Flt. Sub-Lt. R. D., R.N.
Wounded.—Spence, Flt. Sub-Lt. A. G. A., R.N.
Accidentally Injured.—Dow, Proby. Flt. Officer J. A., R.N.
Missing.—Magrath, Flt. Lt. (Paymr., R.N.) W. S., R.N.
Stallard, Flt. Sub-Lt. R. J., R.N.
Rogers, Obsr. Sub-Lt. A. D., R.N.
Previously reported Missing, now reported Prisoner.—Oakley, Flt. Sub-Lt. W. E. B., R.N.

Reported Nov. 17th.

Killed.—Trapp, Flt. Sub-Lt. G. L., R.N.
Wounded.—Robinson, Actg. Flt. Comdr. J., R.N.
Anderson, Obs. Sub-Lt. W. S., R.N.
Previously reported Missing, now reported Prisoner.—Watson, Flt. Sub-Lt. M. J., R.N.

PERSONAL NOTICES.

Death.

ARLISS-ANDREWS.—Flt. Sub-Lt. Eric Arliss-Andrews, who was killed while flying over the North Sea on Nov. 8th, was the elder son of Mr. and Mrs. Charles Arliss-Andrews, of Clavering, Essex. He was 25 years of age.

Marriages.

HAYWARD—PERKINS.—The marriage of Flt. Sub-Lt. Hayward, R.N., and Miss Hilda Perkins took place very quietly at St. Mary's Church, Taunton, on Nov. 17th.

MEADE—CUBITT.—The marriage took place on Nov. 19th, in the private chapel at Eden Hall, of Flt. Lt. William Abbott Meade, R.N., only son of Mr. and Mrs. Meade, of Woodbury, Surrey, and Miss Vera Cubitt, eldest daughter of Lt. Count and Countess Riccardi-Cubitt, of Eden Hall, Edenbridge, Kent. The Rev. Father J. H. Pollen officiated.

Births.

BIRKBECK.—On Nov. 11th, at The Pheasantry, 152, King's Road, Chelsea, the wife of Flt. Lt. Michael Birkbeck, Royal Navy, of a son.

COOPER.—On Nov. 13th, at Dunkirk, Felixstowe, Renee, wife of Flt. Comdr. Arthur L. Cooper, R.N.—a daughter.

MILITARY.

G.H.Q. Communiqués.

Nov. 13th, 9.10 p.m.—Although fine weather prevailed on the 12th inst., a heavy ground mist rendered observation from the air difficult. A considerable amount of work, nevertheless, was accomplished by our aeroplanes, and a number of successful bombardments were carried out by our artillery with aeroplane observation.

Our low-flying aeroplanes engaged many ground targets with machine-gun fire. Several successful reconnaissances were carried out, and many photographs were taken.

During the day bombs were dropped on various centres of hostile activity, but weather conditions prevented bombing operations by night. Hostile aeroplanes dropped a few bombs on our side of the line in the course of the day.

A number of fights took place in the air, in the course of which we brought down one hostile machine, and drove down five others out of control.

Two of our machines failed to return.

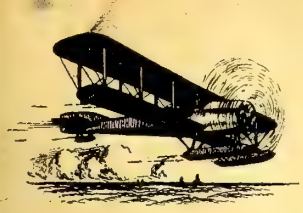
Nov. 14th, 9.52 p.m.—Heavy ground mist throughout the 13th inst. again rendered observation from the air very difficult. A few successful bombardments were carried out by our artillery with aerial observation, and a few photographs were taken.

Our low-flying aeroplanes engaged several ground targets with machine-gun fire.

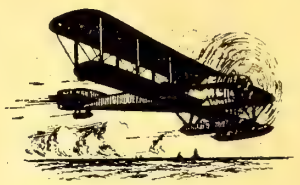
Hostile aeroplanes dropped some bombs behind our lines during the evening and at night.

In the course of the day we brought down two hostile aeroplanes in air fighting, and drove down four others out of control. Another hostile machine was shot down in our lines by anti-aircraft gun fire.

All our aeroplanes returned.



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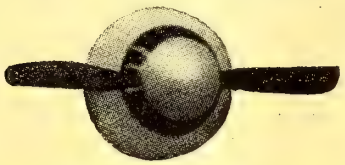
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Nov. 16th, 9 p.m.—During the early part of the 15th inst. a heavy ground mist considerably hampered aerial observation. Later in the day the mist partially cleared, and considerable activity in the air ensued.

Many targets were successfully engaged by our artillery, with aerial observation, and a number of reconnaissances were carried out by our aeroplanes.

On the battle front our low-flying machines engaged several ground targets with machine-gun fire.

Hostile aeroplanes dropped a few bombs on our side of the line.

In air fighting five hostile aeroplanes were brought down, and one was driven down out of control. Another German machine was shot down by anti-aircraft guns.

Four of our aeroplanes failed to return.

Nov. 19th, 9.30 p.m.—On the 18th instant, in spite of low clouds and poor visibility, some successful artillery work was carried out by us with aeroplane observation.

A few ground targets were engaged by our aeroplanes with machine-gun fire, and a few bombs were dropped on the enemy's lines.

In air fighting, two hostile machines were brought down and one was driven down out of control. Another hostile machine was shot down by fire from the ground.

One of our machines is missing.

The Casualty List.

Reported Nov. 14th.

Killed.—Yates, Sec. Lt. J. E., R.F.C.
Missing.—Hutton, Sec. Lt. W. W., Lond. R., attd. R.F.C.
Canadian Contingent.—Died of Wounds.—Geddes, Lt. J. R., Cent. Ont. R., attd. R.F.C.

Reported Nov. 15th.

Previously reported Missing, believed Killed, now reported Killed.—Paget, Lt. G. L., North'd Fus., attd. R.F.C.
Previously reported Missing, now reported Killed.—Lloyd, Sec. Lt. R. S., R.F.C.
MacBrayne, Sec. Lt. D. C. H., R.F.C.
Miller, Sec. Lt. G. C., High. L.I., attd. R.F.C.
Pemberton, Capt. F. D., R.F.A., attd. R.F.C.
Walton, Lt. O. T., S. Lan. R., attd. R.F.C.
Ward-Price, Capt. L. S., Household Cav., attd. R.F.C.
Watlington, Sec. Lt. H. J., R.F.C.
Williams, Sec. Lt. S. N., R.F.C.
Died of Wounds.—Boor, Lt. A. P., R.F.C.
Wounded.—Bomford, Sec. Lt. H. J. P., Lond. R., attd. R.F.C.
Helbert, Lt. L. A. C., R.F.C.
Walters, Capt. J. P., R. Dub. Fus., attd. R.F.C.
Youdale, Sec. Lt. A. C., M.C., R.F.C.
Missing.—Gubbin, Sec. Lt. J. R. F., R.F.C.
McLaurin, Sec. Lt. D., R.F.C.
Previously reported Missing, now reported Prisoners in German Hands.—Fenwick, Sec. Lt. T. B., R.F.C.
Taylor, Sec. Lt. N. J., R.F.C.
Previously reported Missing, now reported Interned in Holland.—Frost, Sec. Lt. J., R.F.C.
Smith, Sec. Lt. F. L., R.F.C.
Canadian Contingent.—Wounded.—Robertson, Lt. A. R., Man. R., attd. R.F.C.
Missing.—Crowther, Lt. W., Cent. Ont. R., attd. R.F.C.

Reported Nov. 16th.

Died of Wounds.—Hunter, Sec. Lt. H., R.F.C.
Wounded.—Whitehead, Sec. Lt. F., Yeo., attd. R.F.C.
Previously reported Prisoner of War, now reported Wounded and Prisoner of War in German Hands.—Thompson, Sec. Lt. S. F., Suff., attd. R.F.C.

Reported Nov 17th.

Killed.—Ellis, Capt. B. G. L., R.F.A., attd. R.F.C.
Poundall, Capt. W. A. L., M.C., S. Lan. R., attd. R.F.C.
Ripley, Sec. Lt. E. R., R.F.C.
Previously reported Missing, now reported Killed.—Goode, Lt. G. M., R.F.C.
Swann, Sec. Lt. G. H., R.F.C.
Wedderspoon, Lt. J. H. B., R.F.A., R.F.C.
Missing.—Frith, Sec. Lt. R. G., R.F.C.
Taylor, Lt. R. C., R. War. R., attd. R.F.C.
Previously reported Prisoners, now reported Wounded and Prisoners in German Hands.—Ellam, Sec. Lt. H. J., R.F.C.
Pickett, Lt. A. C., R.F.C.
Thompson, Sec. Lt. S., R.F.C.
Waring, Sec. Lt. H. E. A., R.F.C.
Watt, Sec. Lt. W. H., Ches. R., attd. R.F.C.
Previously reported Missing, now reported Prisoners in German Hands.—Berry, Sec. Lt. F. H., R. Scots, attd. R.F.C.
Casey, Sec. Lt. P. J., R.F.C.
Colbert, Sec. Lt. L. A., R.F.C.
Gray, Sec. Lt. C. G. D., R.F.C.
Haight, Sec. Lt. J. L., R.F.C.
Hill, Lt. R. I. V., Welsh R., attd. R.F.C.
Jeffs, Lt. C. H., Bord. R., attd. R.F.C.
Mumford, Lt. G. W., A.S.C., attd. R.F.C.
Powell, Lt. D. G., S. Wales Bord., attd. R.F.C.
Pughe-Evans, Sec. Lt. H., Welsh R., attd. R.F.C.
Walrond-Skinner, Capt. D. D., Mon. R., attd. R.F.C.
Westcott, Lt. G. F., R.F.C.

Reported Nov. 19th.

Killed.—Richardson, Sec. Lt. R. H., Lond. R., attd. R.F.C.
Wounded.—Blane, Sec. Lt. J. G., R.F.C.
Brander, Lt. L. S., R.F.C.
Dormer, Sec. Lt. F. H., R.F.C.
Kyle, Sec. Lt. J., R.F.C.
Mills, Sec. Lt. K. Le G., R.F.C.
Missing.—Baker, Sec. Lt. F. G., R.F.C.
Bruce, Sec. Lt. T. B., R.F.C.
Cribb, Sec. Lt. A. G., R.F.C.
Cutbill, Sec. Lt. F. H., R.F.C.
Downing, Sec. Lt. H. G., R.F.C.
Duggan, Sec. Lt. J. H. W., Glouc. R., attd. R.F.C.
Gartside-Tippinge, Sec. Lt. F., R.F.C.
Gordon, Lt. E. G. S., R.F.C.
Simpson, Sec. Lt. C. B., R.F.C.
Wilmot, Sec. Lt. E. P., M.C., R.F.C.

Reported Nov. 20th.

Killed.—Cato, Sec. Lt. G. M. W. G., R.F.C.
Livock, Lt. E. S., Queen's (R. W. Surr. R.), attd. R.F.C.
Morgan, Lt. H. R., Yeomanry, attd. R.F.C.
Wounded.—Henderson, Maj. G. L. P., M.C., R.F.C.
White, Sec. Lt. W. L. C., R.F.C.
Missing.—Cowan, Capt. P. C., Manch. R., attd. R.F.C.
Grose, Sec. Lt. A. G., R.F.C.
Grimwood, Sec. Lt. B. C. R., M.C., R.F.C.
Hammersley, Sec. Lt. F. J. B., Midd'x R., attd. R.F.C.

* * *

Casualties among N.C.O.'s and Men.

The dates are those of the official list.

Previously reported Missing, now reported Killed.

Nov. 8th.—R.F.C.—Bright 89279 2nd Cl. Air Mech. H. H. (Newbury).

Died of Wounds.

Nov. 9th.—R.F.C.—Stiby 63190 2nd Cl. Air Mech. F. G. (Bath).
Nov. 10th.—Thimann 43670 1st Cl. Air Mech R. P. (Lee, S.E.).

Accidentally Killed.

Nov. 8th.—R.F.C.—Robb 19193 1st Cl. Air Mech. A. J. (Edinburgh).

Died.

Nov. 6th.—R.F.C.—Clayton 49987 3rd Cl. Air Mech. W. B. (Westminster, S.W.).
Nov. 7th.—Manning 22339 1st Cl. Air Mech. G. (Redhill).

Wounded.

Nov. 8th.—R.F.C.—Barker 68771 1st Cl. Air Mech. J. E. (Chelmsford); Burch 39997 2nd Cl. Air Mech. A. E. (Lymington); Starkey 19205 Cpl. F. (Cadishead); Snowden 13743 Sjt. A. C. (Nottingham); Webster 75254 2nd Cl. Air Mech. A. (Brighton).

R.F.C., attd. R.G.A.—Callaghan 43659 2nd Cl. Air Mech. S. (Abbey Wood, S.E.).

Nov. 9th.—R.F.C.—Taylor 10555 2nd Cl. Air Mech. R. H. (Folkestone); Wilmshurst 30133 2nd Cl. Air Mech T. L. (Huddersfield).
Nov. 10th.—Harling 7447 1st Cl. Air Mech. J. W. (Colne); Milton 8981 2nd Cl. Air Mech. G. (Hampstead, N.W.); Parsons 43263 2nd Cl. Air Mech. W. H. (Earlsfield).

Missing.

Nov. 10th.—R.F.C.—Legge 25233 Sjt. F. (Hale).

The following report has been received:—

Previously reported Missing, now reported Prisoner of War in German Hands.

Nov. 8th.—R.F.C.—Bancroft 19130 Sjt. J. (Carrington, Manchester).

PERSONAL NOTICES.

Deaths.

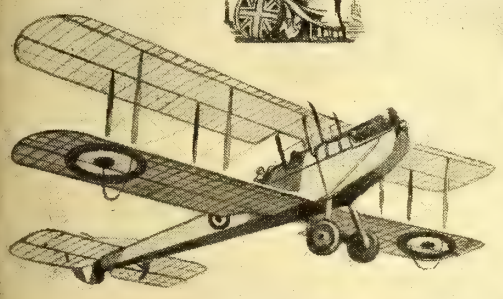
ARMSTRONG and HUGHES.—Sec. Lt. H. M. Armstrong, R.F.C., of Canada, and Sec. Lt. E. Hughes, R.F.C., of Australia, were killed on Nov. 14th in an aeroplane collision above the railway line between Corstorphine and the Firth of Forth. The machines were flying at a considerable height when they came into collision and took fire.

CHAPMAN.—Lt. William Wetherall Chapman, The 'Buffs, attd. R.F.C., who was reported missing on Oct. 7th, and is now reported killed, was younger and only surviving son of Mr. and Mrs. William C. N. Chapman, of Heppington, Canterbury. He was 21 years of age, and reached the rank of lieutenant in Feb., 1915.

CRISP.—Sec. Lt. Harold Dudley Crisp, R.F.C., who was killed while flying at Newcastle on Nov. 6th, was the younger son of Mr. and Mrs. T. Crisp, The Grove, Docking, Norfolk. He was 22 years of age.

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CROOKE and RUSSEL.—An inquest was held on Nov. 14th on the bodies of Lt. Walter Crooke, R.F.C., aged 18, and Lt. J. H. Russel, R.F.C., aged 27, whose deaths, as the result of a collision, were announced last week.

The evidence showed that four machines were manœuvring into close formation. Three got into position and Mr. Crook made a dive to come up with the rest. He apparently did not note that the squadron leader had somewhat altered his course, with the result that his machine struck the fuselage of Mr. Russel's machine, and both fell out of control from a height of 5,000 feet, the two pilots being killed. A verdict of accidental death was returned.

Sec. Lt. Walter Crooke, R.F.C., was the son of Mr. and Mrs. Walter Crooke, Priors Lee, Shifnal.

[This is evidently a case in which parachutes might have saved lives.—Ed.]

ELLWOOD.—Sec. Lt. Robert Vernon Ellwood, R.F.C., whose home is at Kensington, died at York Military Hospital on Nov. 17th, as the result of burns and injuries received in a flying accident near York on Nov. 16th. The machine nose-dived to the earth, landing in a field, and immediately bursting into flames.

HALLIWELL.—Lt. Eric John Halliwell, R.F.A., attd. R.F.C., was the elder son of Mr. E. A. Halliwell, of Johannesburg, the well-known South African and International wicket-keeper. He was born in South Africa, but came to England at an early age, and was educated at Haw Bank, Cheadle, Cheshire, and Brighton College, where he took a keen part in all sports, and was a member of the Cadet Corps. He returned to South Africa in 1913, and at the outbreak of war was working on the mines of the E.R.P.M. Company, controlled by the late Sir George Farrar. He was then under 18 years of age, and enlisted in the Transvaal Scottish, with whom he served through the whole campaign in German South-West Africa, obtained non-commissioned rank, and was present at the final "round-up" at Otavifontein in July, 1915. He then returned to England, arriving in Sept., 1915, obtained a commission in the R.F.A. (Special Reserve of Officers), and proceeded to France, where he served in various sectors of the front, and was wounded at Calonne (Vimy Ridge) in March, 1916. He returned to the front in Nov., 1916, and for several months saw much fighting, latterly acting as captain. He then transferred to the R.F.C., reverting to Sec. Lt., and, after short training, returned to the front as an "observer" at the end of last July. In about a month he obtained his "wings" and promotion to lieutenant. On Sept. 11th he was reported missing, the only news at first being that he was flying a considerable distance beyond the enemy lines, and had encountered hostile machines, but a message subsequently dropped by German aviators over our lines, and later the returns for September published in the German Press, state that he and his pilot were killed. He was in his 21st year.

HARMAN.—Lieut. John Augustus Harman, R.F.C., was the eldest son of Mr. John Eustace Harman, barrister, of Lincoln's Inn, and Mrs. Harman, of 45, Onslow Square, S.W. He was educated at Edgeborough, Guildford, and at Uppingham School. He came from Ceylon, where he had been on a tea plantation, in the summer of 1915, and received a commission in the Army Service Corps, with which he served at Suvla Bay, Egypt, and Salonika. At the beginning of this year he joined the R.F.C., and got his wings in Egypt. He returned home in June, and was attached to a home defence squadron. He was accidentally killed while night flying on November 17th. He was 24 years of age.

HOLMAN.—Lt. Gerald Chaplin Holman, A.S.C. and R.F.C., who was reported missing on Sept. 17th, 1917, now reported killed (after eight months' air-fighting) in an air-fight over German lines while leading his patrol, was the only son of the late H. Broughton Holman and of Mrs. Holman, 16, Wilton Road, Muswell Hill. He was 21 years of age.

LIVOCK.—Lt. Eric Stuart Livock, "Queen's" and R.F.C., who was killed in action on Nov. 8th, was the youngest son of the late H. A. Livock and of Mrs. Livock, 31, Broom Water, Teddington. He was 22 years of age.

MACANDREW.—Lt. Colin Glen Orr MacAndrew, Yeomanry, attd. R.F.C. (killed in action on Oct. 2nd), was second son of the late F. G. MacAndrew and of Mrs. MacAndrew, Stewartlea, Ayr. He was 20 years of age, and received his commission in the Yeomanry in Nov., 1914; he had his "wings" in the R.F.C. in April of this year.

MILLS.—Sec. Lieut. Kenneth Le Gaye Mills, R.F.C., was the younger son of Mrs. Mills and the late Colonel Arthur Mills, solicitor, of Hull, and Registrar of Hedon County Court. He was 19 years of age, and was educated at Beverley Grammar School and Framlingham College. He studied for the law and was articled to Messrs. Locking, Holditch, and Locking, of Hull. He joined the Artists O.T.C. in October, 1915, being then 17 years old. Later he was offered a commission in the Grenadier Guards, but, in preference, accepted one in the R.F.C. last February. He obtained his wings in the following June. He joined a squadron at the front in August, and died in a clearing hospital on November 11th, of wounds received five days previously.

PHILIPPS and BARR.—An inquest was held in South Yorkshire on Nov. 16th on the bodies of Lt. Benjamin Wynford Philipps, aged 24, of Newport (Shropshire), and Sec. Lt. John William Barr, R.F.C., aged 18, of Sunderland, who were killed on Nov. 14th. Their machine nose-dived from a height of 500 feet, the left wing breaking as it neared the ground. A vredict of accidental death was returned.

POTTS.—Lt. William Janson Potts, R.F.A., attd. R.F.C., who was reported missing on Sept. 21st, is now reported killed in action. Mr. Potts was the only surviving son of the late William Potts, Esq., and Mrs. Potts, of Sanderstead Hill, and husband of Gladys Isabelle Potts (née Thorndike), of Blackheath.

ROBERTSON.—Lt. Robertson, R.F.C., a Canadian, was killed in Lincolnshire on Nov. 16th by making a faulty landing after having engine trouble while on a flying patrol.

He was flying on Nov. 16th very low—so low as to nearly come into collision with the buildings. Eventually he came down in a field, and then rose again, but only went a short distance, when the machine nose-dived, and came down in a field. The machine was smashed, and Mr. Robertson fatally injured.

SCOTT.—Lt. D. Harden Scott, R.F.C., who was killed in action on Nov. 12th, was the son of Mr. M. Scott, Ballynahinch, County Down. He won the Military Cross in August last year for a brilliant single-handed attack against superior numbers; his controls were shot away, but he brought his machine safely down, although he himself was seriously injured.

SIDNEY.—Sec. Lt. Leicester P. Sidney, K.R.R.C., attd. R.F.C., was reported missing on Oct. 2nd, and has since been reported killed. He was 24 years of age, and was educated at the City of London School, whence he proceeded to the National Physical Laboratory, Teddington, where, by special permission of the Governing Board, he studied in the testing laboratories, under Dr. Stanton, and in the metallurgical laboratories, under Dr. Rosenhain. On leaving Teddington he spent a year in iron and steel analysis with Mr. F. W. Harbord, and afterwards served for some time in the fitting and pattern shops of the Ebbw Vale Iron, Steel, and Coal Company. When the war broke out he was in the service of Bell Brothers, Middlesbrough, as metallurgist. He enlisted in the first month of the war in the King's Royal Rifle Corps, in which regiment he was given a commision in Jan., 1915. After serving about 18 months in the trenches, and for some time at home, he transferred to the R.F.C., and was serving, at the time of his death, as an observer.

WEBB.—Capt. Noel William Ward Webb, M.C., Flight Commander, R.F.C., missing on August 16th, and since reported through the Queen Victoria Jubilee Fund Association, Geneva, as killed on that date, was in his 21st year. He was the youngest son of Mr. and Mrs. W. Trego Webb, of 7, Scarsdale Villas, Kensington. He was educated at St. Paul's School, and played for their first Rugby team. In March, 1916, he received a commission in the R.F.C., obtained his wings in June, and went to the front. In September he was invalided home, and received the M.C. and promotion to flight commander. He was then posted to a squadron in England, where he acted as instructor, and during the latter part of the time as squadron commander. Last June he returned to the front to a scout squadron. Some time after his arrival, when out on a practice flight alone, he fought a German two-seater, and forced it down in our lines. He proved himself a brilliant pilot, and had 12 enemy machines to his credit. In July he was awarded a bar to his M.C. On August 16th, when leading his flight on patrol, he encountered a large formation of enemy machines, and was last seen diving on two hostile aircraft.

WEST.—Sec. Lt. Mortimer West, R.F.C., who was killed in action on Nov. 11th, was the youngest son of the late Frederic West and Mrs. West, of Shawford Down, Winchester.

WILKINSON.—Sec. Lt. G. M. Wilkinson ("Miles"), D. of C.L.I., attd. R.F.C., who was killed in action in Flanders on Oct. 10th, was the youngest son of Mr. and Mrs. Henry Wall Wilkinson, of 14, Creffield Road, Ealing, W. He was 19 years of age. Mr. Wilkinson had previously been reported missing.

WILLARD.—Sec. Lt. Kenneth Hugh Willard, York and Lancaster Regt., attd. R.F.C., who was killed in action on Oct. 12th, was the second son of Mr. and Mrs. T. W. Willard, Rugby, Warwickshire. He was 19 years of age.

WILLIAMS.—Sec. Lt. Norman Ernest Williams, London Regt. attd. R.F.C., joined the United Arts Corps in 1914, in which he specialised in signalling, and the 7th Hampshire Regt. in Jan., 1915. He became serjeant of the signalling company, and subsequently joined the Inns of Court O.T.C., obtaining his commission in the London Regt. on Dec. 18th, 1915. In Oct., 1916, he proceeded to the front and saw much active service. He was signalling officer to the battalion in the fight on Messines Ridge, and was highly complimented by his colonel for his valuable work. Last June he was transferred into the R.F.C., and after two months' training returned to the front. While engaged on an important mission he was attacked by six enemy machines, and, although he and his pilot fought with the greatest skill,

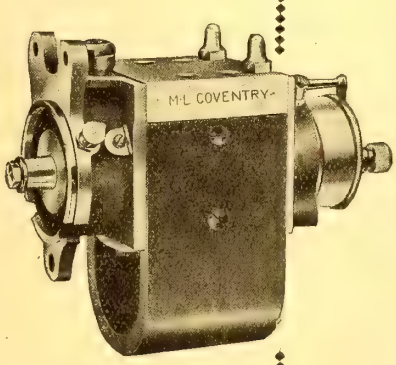
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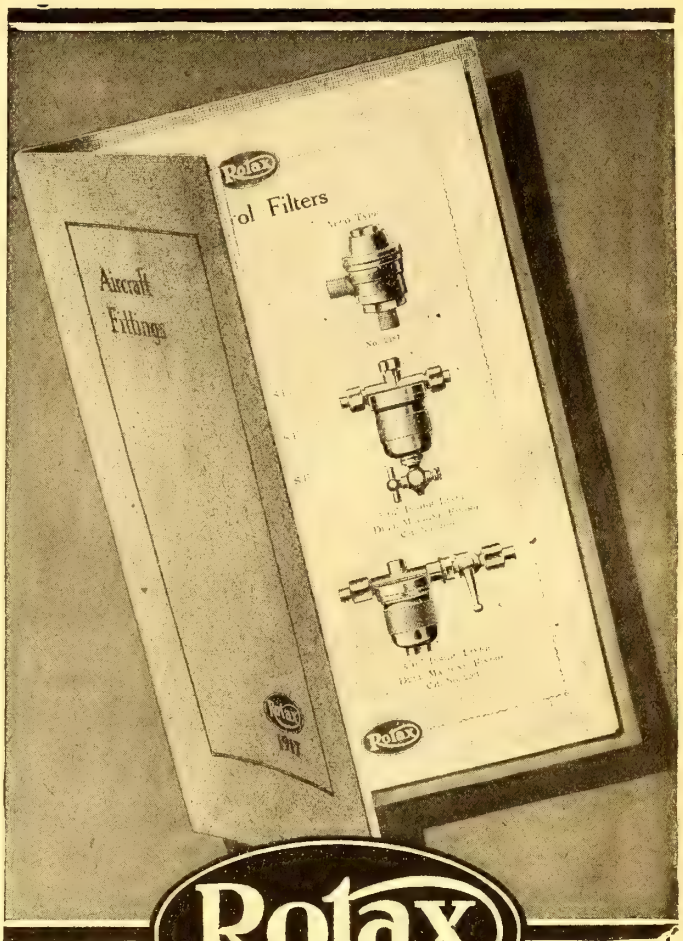
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bravery, and determination, they could not prevail against such overwhelming odds.

Mr. Williams was the only son of Mr. E. Croft-Williams, of Newlands Park, Sydenham, and was in his 25th year. He studied for the law with Messrs. J. H. Mote and Son, Gray's Inn, and left this firm for Messrs. Syrett and Sons, Finsbury Pavement, to whom he was to have been articled.

Engagements.

LLOYD—LOUDON.—The engagement is announced of Capt. Humphrey Clifford LLoyd, M.C., 60th Rifles, attached R.F.C., only son of Colonel Wilford LLoyd, M.V.O., Royal Body Guard, and Mrs. LLoyd, and Constance, only daughter of Mr. and Mrs. James Hope Loudon, Olantigh, Wye, Kent.

SOMERVELL—NAYLOR.—An engagement is announced between Capt. Rupert C. G. Somervell, 60th Rifles, attached R.F.C., only surviving son of Mr. and Mrs. Geldred Somervell, of Haseley Manor, Wallingford, and Olive Winifred, younger daughter of Mr. and Mrs. Alfred Naylor, of 16, Southwell Gardens, S.W.

TRUSCOTT—WILKIE.—An engagement is announced between Mr. J. H. Truscott, Devon. Regt. and R.F.C., only son of Lt.-Col. J. J. and Mrs. Truscott, of Twickenham, and Freda, youngest daughter of Mr. and Mrs. George Wilkie, Doncaster.

Marriages.

CHAPMAN—LEADER.—On Nov. 10th, at St. John's Church, Clapham Rise, Lt. V. C. Chapman, R.F.C., was married to Dorothy Cecil, daughter of the late Comdr R. C. Leader, R.N., by the Rev. H. Elkerton, vicar.

CLAPPEN—KNIGHT.—On the 14th inst., at Southend-on-Sea, Capt. William Clappen, R.F.C., son of Mr. Clappen, of Westcliff-on-Sea, was married to Kathleen Mary Broughton Knight, second daughter of Mr. and Mrs. J. B. Knight, of Prittlewell, by the Rev. D. Ewart James, M.A.

DE ROEMER—LIDDELL.—The marriage of Major C. W. de Roemer, R.F.A., attd. R.F.C., and Miss Audrey Liddell, took place at St. Andrew's Church, Ashley Place, on November 21st, at 2.15 p.m.

LONG—STUART-BLACK.—On Nov. 12th, at All Souls', Langham Place, Lt. Philip J. Long, R.F.C., son of Brig.-General Arthur Long, was married to Eleanor, daughter of the late John Stuart-Black, of Ditton Hill, Surrey, and of Mrs. Stuart-Black.

MILES—LARNER.—On Nov. 17th, at Wendover, Bucks, Corpl. Frank Miles, R.F.C., was married to Ethel Isabel Larner.

RIVERSDALE-ELLIOT—BARRY.—The marriage of Capt. K. H. Riversdale-Elliot, Scottish Rifles and R.F.C., only son of Lt.-Co. C. R. Elliot, late 30th Lancers, and of Mrs. Elliot, to Nancy, second daughter of Mr. and Mrs. C. J. Barry, of Ardlethen, Hampstead Heath, took place at All Saints' Church, Child's Hill, at 12.15 p.m., on Nov. 17th.

STUART-SMITH—PALEY.—On Nov. 16th, at Tunbridge Wells, Philip James, Lt., Canadian Cavalry, attd. R.F.C., elder son of James and Mrs. Stuart-Smith, was married to Claire Gertrude, eldest daughter of the late Cuthbert Henry and Mrs. Paley, of Hove, Sussex.

WARD—NICHOLSON.—The marriage took place on Nov. 15th, at St. Ethelburga's, Bishopsgate Street Within, of Capt. Herbert Sanford Ward, R.F.C., elder son of Herbert Ward, of 105, Avenue de Malakoff, Paris, and Miss Joyce Nicholson, younger daughter of Sir Charles Norris Nicholson, M.P.; of 35, Harrington Gardens, S.W.

Births.

BOLTON.—On Nov. 11th, at 1, Springfield Place, Bath, the wife of Capt. N. A. Bolton, R.F.C., of a daughter.

FORBES.—On Nov. 14th, at 10, Rosslyn Hill, Hampstead, the wife of Sec. Lt. P. Leckie Forbes, Middlesex Regt., attd. R.F.C.—a son (Alec Patrick Leckie).

PAIN.—On Nov. 15th, at 5, Upper Wimpole Street, W., the wife of Capt. John Wyndham Pain, R.F.C., of a son.

RICHARDSON.—On November 11th, at Ecclesbourne, W. Byfleet, the wife of Sec. Lt. E. C. Richardson, R.F.C., of a daughter.

Lt. R. L. Graham, R.F.C., has been missing from the Western Front since Sept. 16th. If correspondents of prisoners of war in Germany could get any information, his mother, Mrs. Graham, of 5, Golf Place, St. Andrews, Scotland, would be most grateful.

* * *

Mrs. MacAndrew, Stewartlea, Ayr, Scotland, would be grateful for any news of her son, Sec. Lt. C. G. O. MacAndrew, Ayrshire Yeomanry, attd. R.F.C., (and holding rank of Captain and Flight Commander), British Expeditionary Force, France. He has been missing since Oct. 2nd.

* * *

Lt.-Col. C. F. Lee, R.F.C., and Mrs. Lee, of Stoke Court, near Taunton, are proceeding to America immediately, and desire that all business communications concerning them be forwarded direct to Messrs. Benson, Burdekin, and Co., 41, Norfolk Street, Sheffield.

Lt. Edmond Montgomery, R.F.C., aged 21, met with a serious accident when flying a new machine in Shropshire on Nov. 16th. After looping the loop he was unable to right the machine, which crashed into a coal yard adjoining the railway. The aeroplane was smashed, the officer's legs were broken, and his skull fractured. He now lies in hospital in a critical condition.

* * *

Mr. W. T. Massey, writing of the Turkish retreat from Gaza on Nov. 14th, says in the "Morning Post":—

During their ceaseless work the aviators paid much attention to the enemy's lines of communication, and scored hits on trains with bombs weighing a hundredweight, while the wreckage in an enemy aerodrome in our possession consists of the remains of five two-seater aeroplanes and three spare engines.

FRANCE.

Official Communiqués.

Nov. 14th.—An enemy aeroplane was brought down in aerial combat in the region of Dammarie, the two aviators being captured.

Nov. 15th.—On Nov. 13th in the daytime four German aeroplanes were brought down by our pilots and four others fell out of control in their lines.

Our bombarding aircraft carried out several operations and bombarded with projectiles various enemy depots and cantonments in the region of Mulhouse.

German aeroplanes bombarded the region of Calais during the night of Nov. 13th. A certain number of victims are reported among the civilian population.

Nov. 16th.—German aeroplanes bombarded the region south of Nancy. There were no victims.

Army of the Orient.—In the region of Prilep and in the valley of the Vardar French and British aviators bombarded some aerodromes.

* * *

A German biplane landed near Macon, on the Saone, on Nov. 5th, and the occupants—a lieutenant and a serjeant-major—were taken prisoners.

* * *

The "Matin" of Nov. 18th publishes an article by M. Lasies, Deputy for Paris, on "Aerial Tanks," in which the writer urges the necessity of constructing without delay armoured bombing aeroplanes.

He states that for several months the Germans have been using an aeroplane, of the "Junker" type, made entirely of metal, the vital parts being protected by bullet-proof armour. They can thus be employed for shooting work without much danger.

"In the coming attacks," says M. Lasies, "French aviators must be able to lead their comrades in the trenches by the hand. Aerial tanks must be built such as those which the Germans already have. We hope that soon everything will be as it ought to be for our air squadrons at the front."

[Vide the old German "copper-belly" biplane of the Ypres salient in 1915.—Ed.]

GERMANY.

Official Communiqués.

Nov. 13th.—Lt. Bongartz gained his 22nd and Vice-Serjt. Major Buckler his 25th aerial victory.

Nov. 16th.—Since Nov. 9th our enemies have lost 24 aeroplanes in aerial encounters and by anti-aircraft fire. Vice-Serjt. Major Buckler has gained his 26th, Lt. Bongartz his 23rd, aerial victory.

Nov. 19th.—Serjt.-Major Buckler, who on account of his fighting accomplishments has been promoted to be lieutenant, yesterday shot down one enemy aeroplane and two captive balloons, and thereby gained his 27th, 28th, and 29th aerial victories.

ITALY.

Official Communiqués.

Nov. 13th.—During yesterday, in spite of the unfavourable atmospheric conditions, a large number of our aviators bombarded enemy bivouacs on the left bank of the Piave and turned machine-gun fire at low altitude on the troops marching along the road on the bank of the river.

Nov. 14th.—Our aviators effectively renewed their bombarding actions.

Nov. 15th.—Yesterday our aeroplanes effectively bombarded the bridges on the Livenza and on the Monticano, and, flying at a height of a few hundred metres, attacked with machine-gun fire troops and columns on the march along the roads of the Plain.

Nov. 16th.—During the day (yesterday) and in the night aeroplanes and airships repeated the bombardment of the enemy troops along the fluvial lines and ways of access.

Enemy troops massed north of Asiago and in the Gallio Wood were bombarded by our aeroplanes.

Nov. 17th.—On the lower reaches of the Piave the Royal Navy, with aircraft, floating and ground batteries, and light forces, is effectively contributing to the defence.

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President: The Rt. Hon. LORD ALDENHAM, M.A.

The attention of all engineering and manufacturing firms engaged on important Munition work, and especially those firms employing a large number of female workers, is directed to the following statement appearing in Memorandum No. 15, entitled "The Effect of Industrial Conditions upon Eyesight," and issued by the Health of Munition Workers' Committee appointed by the Ministry of Munitions:—

> **"Notwithstanding the important bearing which good eyesight must have upon output, the question is not to-day receiving attention at the hands of those whose duty it is to obtain this output."** (par. 5.)

The Institute of Ophthalmic Opticians has, thanks to the patriotic voluntary enrolment of a large number of its members, been able to formulate an Industrial Sight-Testing Scheme, under which it undertakes to provide (voluntarily) qualified Opticians to test the eyesight of factory workers.

N.B.—A qualified Optician is understood to be an ophthalmic optician who has passed either the Sight-Testing Examination of the Spectaclemakers' Company, whose examinations are under the direction of the Rt. Hon. Sir William Hart-Dyke, M.A., and among whose examiners are Mr. H. G. Critchley, M.A., M.D., and other medical men and scientists, or that of the British Optical Association, whose examiners are R. S. Clay, D.Sc., Edwin Edser, A.R.C.S., W. J. M. Ettles, M.D., F.R.C.S., W. W. Haldane Gee, B.Sc., Albert Griffiths, D.Sc., W. J. May, F.R.G.S.

Firms desiring full particulars of this important scheme are requested to write to

Mr. J. HARCOMBE CUFF, Secretary,
Institute of Ophthalmic Opticians,
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Favoured by atmospheric conditions, the work of our aviators was during the day profitably carried out against enemy troops massed.

Nov. 19th.—Enemy troops were repeatedly bombarded in the day by our aeroplanes, and in the night, in spite of the strong wind, by our airships at the basin of Prinolano, to the north-west of Susegana, and at Tezze di Livenza.

* * *

Mr. A. Beaumont writes from Milan on Nov. 13th that a High Commissioner of Aviation has been appointed by Government decree and attached to the Ministry of Munitions in Rome. This amounts to the creation of a special department, equivalent to an Under-Secretaryship for Aeronautics, to control all questions of materials and supplies, as well as the manufacture of flying-machines. The Commissioner will have the right to participate in debates in the Senate and Chamber on all questions concerning his department.

* * *

The few who feared that a paralysis of the Army's eyes might have been caused by the loss of some of the more advanced (in two senses) aerodromes must have been agreeably disillusioned by the reappearance in the bulletins of aerial doings.

Some of the classical camps are, however, in very tight places, if not worse, but the wisdom of keeping all the factories at what has been called an uncomfortable distance from the war zones is now appreciated.

Lt. Dal Mistro, one of the pioneers, who lost his life accomplishing a terribly hazardous mission for which he had volunteered, has been awarded the silver " for valour " medal.

The National Aero League is showing a " film " dealing with the part of the work of preparation less seen, the development of aviation as a trade, etc., which film is also to be shown abroad. It will afford an easy and conclusive answer to clamourers for " a million 'planes for Potsdam to-morrow," et omne hoc genus

T. S. Harvey.

BELGIUM.

Official Communiqué.

Nov. 14th.—Enemy aeroplanes dropped numerous bombs on Adinkerke, Panne, and Furnes, causing numerous victims among the civilian population.

TURKEY.

Official Communiqué.

Nov. 12th.—Enemy cavalry which attacked in the sector of our right wing, was repulsed, and an enemy aeroplane was brought down.

HOLLAND.

Supplementary war estimates for 1917 submitted to the Dutch Second Chamber include over £230,000 for the air service.

AUSTRALIA.

Lieut. Stutt, chief of the Richmond, N.S.W., Flying School, flew in a Curtiss biplane from Point Cook to Richmond, 600 miles, in seven hours 20 minutes actual flying time, establishing a longest Australian non-stop record—viz., 342 miles in four hours ten minutes.

U.S.A.

A Reuter's message from Washington, dated November 19th states that enemy aliens are forbidden to fly aeroplanes, balloons, or airships, or to enter the Panama Canal zone.

* * *

The Aero Club of America announces its intention of awarding medals to American aviators who distinguish themselves by bravery in Europe. The scheme is said to have the benediction of the President of the French Republic, and of General Pershing, G.O.C. American Forces, France. It seems a little quaint to people in this country, who are in the habit of regarding the State as the foundation of military honour, but presumably the scheme is justifiable.

The decoration is described as the "Medal of Merit and Honourable Distinction," and is to be awarded in bronze, silver, and gold, to American and Allied aviators for acts of heroism and for meritorious achievements in the field of aeronautics.

WHAT'S IN A NAME?

A Reuter's message from Amsterdam on Nov. 13th states that Flt.-Sjt. Alexander Boyd has been sentenced to a year's imprisonment for calling Germans Huns. According to the unwittingly amusing account of the Berlin correspondent of the "Kölnische Zeitung," an aeroplane piloted by Lt. Philipps, with Sjt. Boyd as observer, was shot down in the North Sea by a German torpedo-boat at the end of last September, from a height of five thousand feet. A scrap of paper fell into the hands of the vessel's crew, which Boyd attempted to dispatch by carrier-pigeon as the boat came alongside. He had written on it, "Shot down at 6.42. Picked up by the Huns." Boyd was subsequently charged with insulting the German defence forces.

At his examination and application for pardon to the Admiral commnding the Naval Corps, Boyd said, according to the "Kölnische Zeitung": "I have not the slightest idea of the meaning of the word Hun, and I had no intention of insulting Germans. I considered the word just as jocular as the 'fruits' or 'hams' which our soldiers apply to German prisoners. The insulting of the officers and crew of the torpedo-boat was unintentional and due to my ignorance. In all sincerity I beg for pardon." The correspondent adds solemnly, "The foregoing example shows that more courage is needed to use the word Hun face to face with a German than from an island which is regarded as secure."

[The Hun seems to forget that His Imperial Majesty, the Kaiser, first called German troops Huns, in his Imperial address to German Forces operating in China, in alliance with French, British, and Russian troops, during the Boxer Rebellion. Perhaps the sensitive Hun would have preferred to be called a Boche.—Ed.]

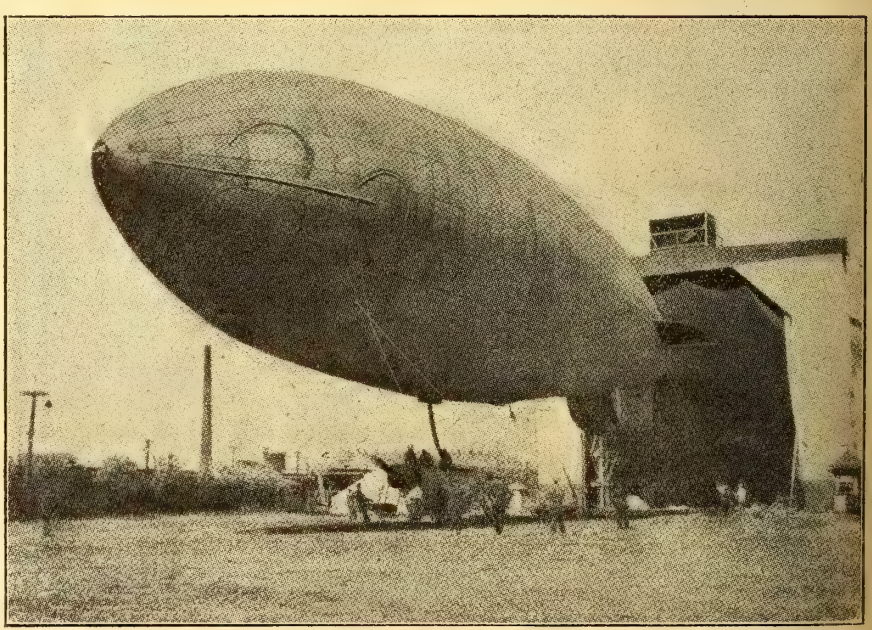
AERONAUTICAL MASONS.

Lieutenant-General Sir Francis Lloyd on Nov. 19th consecrated at the Café Monico the Ad Astra Lodge of Freemasons, No. 3,808, limited in membership to those engaged in the aeronautical inspection department. He installed Lieut.-Col. R. K. Bagnall-Wild as the first W.M. of the lodge, which starts with a founders' list of nearly 80 members. More than 300 were present at the ceremony.

A SOUVENIR OF THE ROYAL FLYING CORPS.

The proprietors of the "Illustrated London News" have published, with the authority of the R.F.C., a special production describing and illustrating the work and training of the Royal Flying Corps. This souvenir number is considerably smaller as regards page size than is the "Illustrated London News," and, therefore, somewhat easier to handle. No complaints, however, will be made as to its thickness.

The photographs are far too numerous to describe in detail, and one can only say that their number and variety offer very good value for the 2s. 6d. asked for the publication. One cannot, however, refrain from calling attention to the photographs of the R.F.C. Hospital, showing the interiors and exteriors of the Bryanston Square and Eaton Square branches. This Hospital was originally started by private subscription, and of late its activities have become so great that contributions from the public will be welcomed by the hon. treasurer.



AN AMERICAN BLIMP.—One of the small two-seater airships enthusiastically described by the American Press as "Aerial Dreadnoughts."

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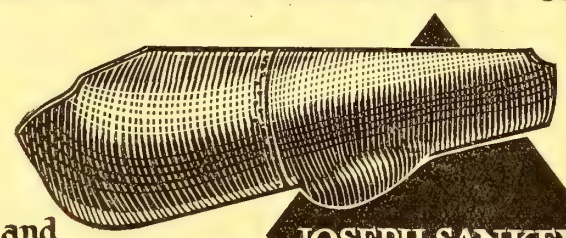
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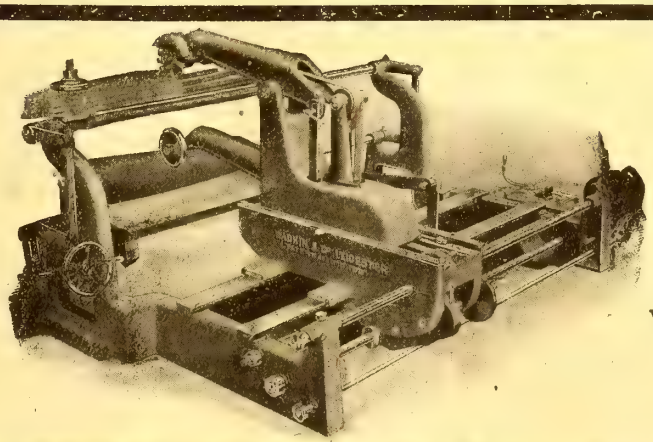
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CONGRATULATIONS.

On Nov. 14th Mr. Harry G. Hawker, the skilful Sopwith test pilot, was married to Miss Muriel Peaty. Mr. Hawker's many friends among the old hands in aviation will wish him and his bride much happiness in their wedded life.

Mr. Hawker's flying career commenced in the very early days at Brooklands, when he acted as mechanic at the Sopwith Flying School, having come over from Australia on purpose to study aviation.

He learned to fly on the British-built Wright biplane, with a 40 h.p. A.B.C. engine, and in 1912 broke the British duration record by flying for just over eight hours non-stop, thus beating the record put up earlier on the same day by Mr. F. P. Raynham on the totally enclosed Avro biplane, with 60 h.p. Green engine.

When the little Sopwith "tabloid" biplane was evolved in 1913, as the joint "brain-wave" of Messrs. Sopwith, Sigrist, and Hawker, Mr. Hawker was chosen to demonstrate its powers. Later he took it to his native country, Australia, where the little machine created a profound impression.

During the course of the war he has tested hundreds of machines of various types, most of them being different examples of the fast Sopwith fighters.

Despite his supreme skill and fearlessness, Mr. Hawker is a very careful pilot, and he has an extremely small catalogue of smashes. He is as much respected by those who know him for his good nature and modesty as for his ability as a pilot.

THOSE QUEER APPOINTMENTS.

The following letter has been received:—

Sir,—I marvel that an assembly like the House of Commons, consisting of all classes of men, could accept with cheers the explanation that the reason Sir John Simon, M.P., was, on joining the Army, immediately promoted to Brigade Major, R.F.C., was that he had given up £20,000 a year. It seems to me that a man who gave up £2 a week gave up more than did Sir John Simon. Such a man as I mention probably gave up everything he had, and also gave up his prospects. Sir John Simon has savings, has a Junior, and can easily return to his £20,000 any day he chooses. There seems to be no law that an M.P. once in the Army should remain in the Army, unless it suits him.

Did it occur to the House that there are men in the Royal Flying Corps who have also thrown up everything; who have served with courage, bravery and endurance on Active Service; who have been wounded once, twice—thrice perhaps—and who are thoroughly fitted by their deeds and close knowledge of their service to hold such a position as is now given to Sir John Simon, M.P.

I have in mind one who has served during the whole duration of war, with distinction and with wounds: a highly-educated man, who has thrown up everything in order to go on *Active* Service. Owing to a fresh wound he will now probably lose his chance of first-class promotion, and will have to start the drudgery of being a Squadron Commander in a fresh Squadron. He has not lost his nerve: he is ready to go back again: but it surprises him to see that the plums are given to a man whose promotion is not due to Active Service, but to the large sum per annum that he is giving up nominally.

Three years of the war have gone, and Sir John Simon has, no doubt, been earning his full income throughout the three years. Many are dead who gave up their all: many are serving who gave up their all.

I know a man with a large estate, who has served in France and Gallipoli who *was* in the Yeomanry. He had lost his health, but not sufficiently to be released from the Army, and yet this man, owing to his losing his health on Active Service, is still a Second Lieutenant.

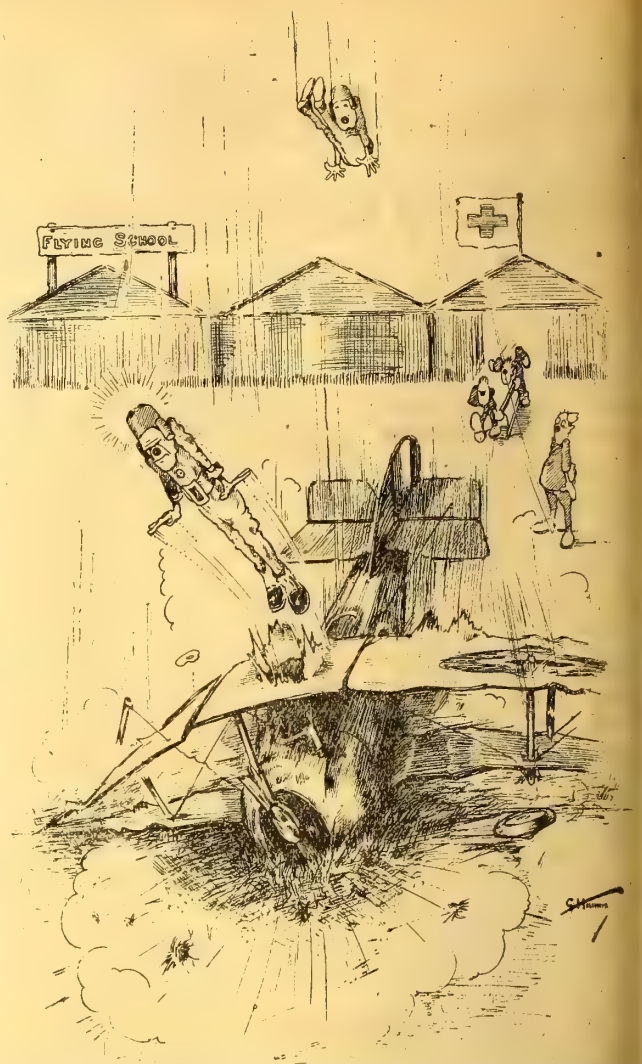
I knew a man in a fine position, aged 38, who gave up everything, who went over——and died in the field, after one year of Active Service as a Second Lieutenant. He had *not* a "father," nor was he an M.P.!

We call this country democratic. I wonder if we are so *at the top?*

I agree with what a subaltern wrote in a paper recently:—"Mother, why haven't I got a father?"

Does the M.P., because he is an M.P., give up more than others? If Sir John Simon had joined up in some special job made for him, it would have been different, and it would not have been so trying for the men who have been and are on Active Service. (Signed) An Onlooker.

[Apparently Sir John Simon *has* joined in a job specially made for him, for it is said that he is to advise G.H.Q. on the question of what towns are, or are not, to be bombed in Germany—if and when we begin bombing Germany. Possibly his excellent legal mind will prevent useless bombing of valueless points, and will prevent wastage of machines and pilots by advising against the starting of raids without proper precautions beforehand, in the way of weather forecasts and general organisation. He may even adapt to the uses of raiding squadrons the financial motto which Mr. George Robey has suggested for the David's Shield Badge of the Hebrew battalions, "No advance without security." One may assume that the same motto expresses Sir John's financial security at home and his physical advance to G.H.Q., France. One may further point out that Sir John's appointment could only have been made under a democratic Government. Certainly no aristocrat would have made it.—Ed.]



HOME TRAINING.—"On the umpieth instant Lieut. Crashem brought down a hostile biplane. This is the tenth aeroplane he has destroyed."

A FRENCH MINISTERIAL MOVE.

During the Cabinet Council and the Council of Ministers, held on the morning of Nov. 19th, at 10 o'clock and 11 o'clock respectively, M. Clemenceau read his Ministerial statement, which was approved.

The Minister of Armaments presented a decree, which was duly signed, to the following effect:—

> In view of the gradual and steady growth of aviation, necessitating an increase of output, and further in order to ensure a co-ordination of the requisite industrial forces by intensifying rational employment of those forces which are at present working under different directing bodies, it becomes necessary for the manufacture of aeroplanes to be placed under the control of the Ministry of Armaments and War Manufactures, which already controls the resources of the required raw material and labour.

The Under Secretaryship of State for Military and Naval Aeronautics is to remain under the control of the Ministry of War, retaining under its orders all the other air services. This department will work in conjunction with the Ministry of Armaments in order to supervise jointly the details of the work of aeroplane manufacture.

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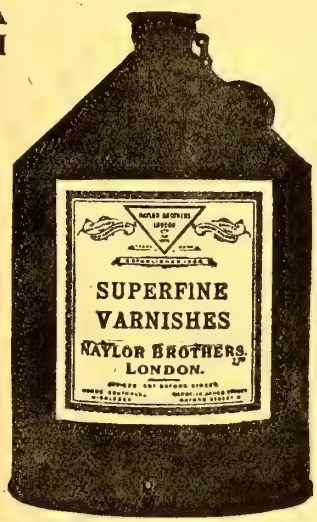
It will be remembered that last Christmas the directors of Cellon, Ltd., presented their friends and clients with a combined desk calendar and scribbling pad. Refills are now being prepared for the year 1918, and the owners of these writing pads are cordially invited to apply for a set to Cellon, Ltd., Broad Street House, London, E.C.2. Supplies are limited, and it will be a case of first come, first served.

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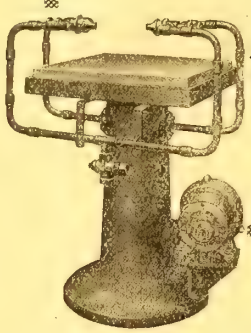


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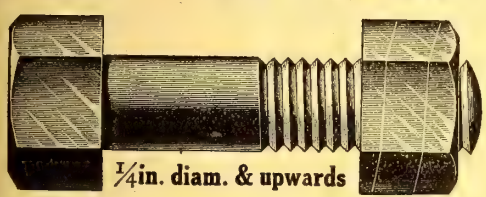
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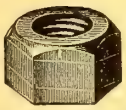
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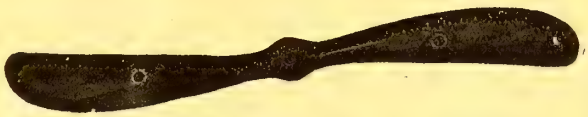
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HOW IT IS DONE.

So few artists are able to draw aeroplanes that look like aeroplanes that it is all the more pleasure to pay a slight tribute to one who has done probably more than any other one artist to inform the British public of the best class as to the aspect and activities of aircraft. Readers of the "Sphere" are, of course, familiar with the work of Mr. G. H. Davis, who long ago made his name as an illustrator of naval subjects, and he is now in a pre-eminent position as a depictor of aircraft of all sorts.

The great feature about Mr. Davis' work is that not only do his aeroplanes look as if they were flying, but they are also technically accurate, which facts, in combination with the really artistic effect of his pictures, account for Mr. Davis' position in the world of art. Unless one has actually seen an aeroplane of a given type in the air it is extraordinarily difficult to achieve the desired aspect of flying when putting it on paper.

Naturally it is not given to London artists to see German aircraft at close quarters every day, and that privilege is likely to become still less frequent with the great improvement in our anti-aircraft defences. Therefore, Mr. Davis has evolved the ingenious idea of making models of German aircraft from such photographs and drawings as are obtainable and drawing his pictures from the models. In this way he is able to get precisely the effect he requires when drawing any given machine in any particular position. The accompanying illustration shows Mr. Davis at work, with a Gotha bomber as well in hand as it is hoped we may have all Germany's offensive aircraft before very long.



WELL IN HAND.—Mr. G. H. Davis, the well-known "Sphere" artist, on a Gotha Model.

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	5 59 SA 8 29 SA	12 01 SA			5½
	5 59 M 8 29 M 1 29 M				
1360		5 02 M			9½
	5 59 TU 8 29 TU 1 29 TU				
32		5 01 TU			9½
Hrs	5 59 W 8 29 W 1 29 W				
		3 00 W	32 hrs	7½	
	3 00 W				
1510	6 00 TH 8 30 TH	5 01 W		2	9½
11½ Hrs	1 29 TH	5 00 TH	11½	9½	9½
K.31.	6 00 T	7 00 F		1	
E.53	7 00 F 8 29 F	10 00 F		2½	
1820	10 00 F 1 30 T	4 00 T		5	
1469	4 00 T	5 00 T		1	9½
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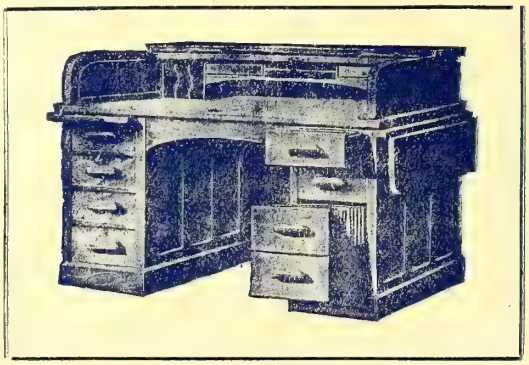
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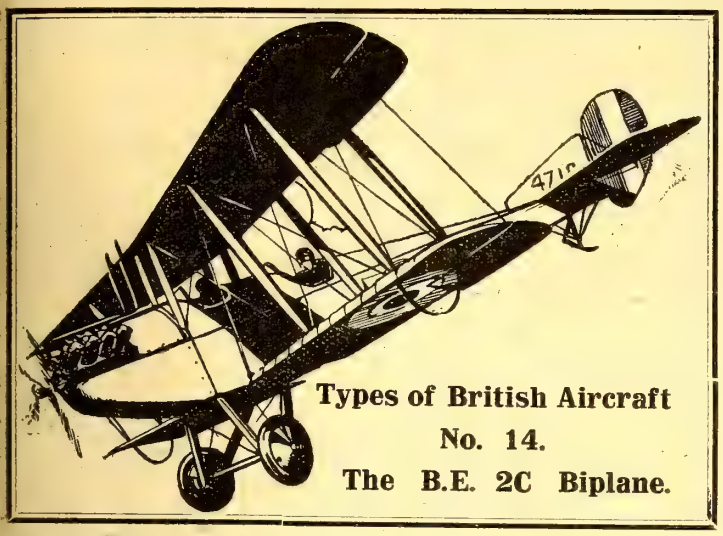
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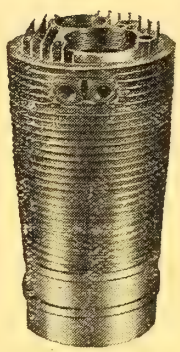
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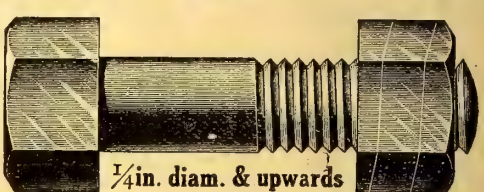
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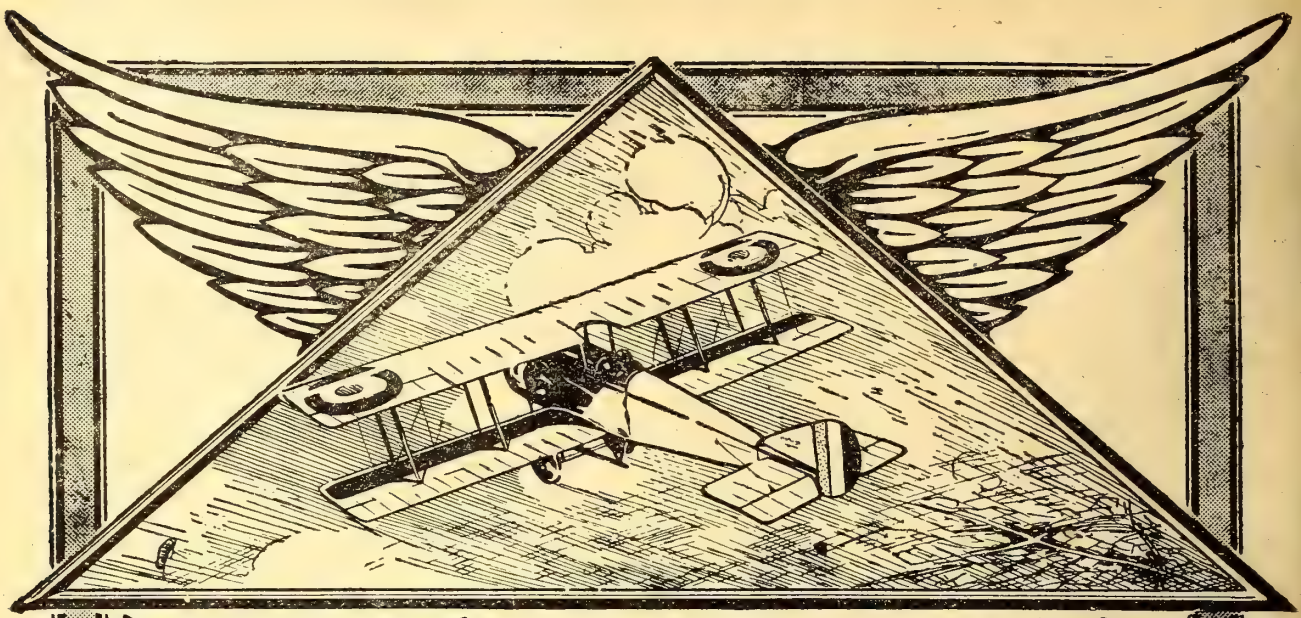
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ON TANKS, CAVALRY, AND AIRCRAFT.

Sir Julian Byng's successful attack in the direction of Cambrai last week opens up to those who have understanding a vision of the future development of war. Therefore, it seems well to set down very briefly the line which that development is likely to take. In the first place, however, it is necessary to refer to certain matters of the past and present.

Primarily, as regards tanks, it should be understood that the tank of to-day is a crudely primitive affair compared with the tank of the future, which will be a land battleship with a speed of 15 miles an hour or more across ordinary open country.

The tanks which went into action on the Somme late in 1916 were practically identical with the designs shown to me by Mr. R. F. Macfie in 1914, a month or so after the outbreak of war. But for a series of muddles and intrigues which ought long ago to have been the subject of a Government enquiry, those tanks could have been in action by June of 1915. Mr. Macfie appears to have been just about as far ahead of contemporary thought with his 1916 designs as he was with his 1914 type. Why his designs have been constantly turned down should also be investigated officially.

However, let it suffice for the purposes of this argument that the tanks of to-day are in relation to the tanks of the immediately possible future what the American "ironclads" of the Civil War would be compared with our latest battleships.

Secondly, a number of foolish wiseacres, among them that much over-rated prophet Mr. H. G. Wells, have been preaching that the day of cavalry is past. So widespread and so deep is this idea that something very like a schism has developed in the military creed, resulting in distinct feeling in some quarters against the cavalry in the field, against the cavalry generals in high commands such as Sir Julian Byng and Sir Edmund Allenby, and even against Sir Douglas Haig himself, as a cavalryman, though almost all our successes have been due to cavalry generals.

People have talked of hundreds of thousands of horses and men, covering miles and miles of country, living in idleness and luxury, eating their heads off and doing nothing. Sir Julian Byng's operations have demonstrated, in quite a small way be it understood, what cavalry can do when properly used and given a fair opportunity. We see now what the cavalry could have done in the Battle of the Somme if we had launched a few hundred tanks in the first attack instead of a few tens of them.

Some of our professional military critics have expressed surprise that tanks should have been sent out against uncut wire. They never knew, poor things, that one of the great points in the original Macfie scheme was that the tanks should do all the wire-smashing, and should roll it in nicely so that the infantry could walk over it, and that our artillery should devote itself entirely to counter-battery work. And it is to be feared that many eminent soldiers, even now, do not realise the possibilities of tanks as thoroughly as some few of us, who were in touch with the original tank designs, realised them three years or more ago. That, however, is by the way.

The logical conclusion to be drawn from the recent operations is that when the tank is properly developed into the land battleship, trench warfare cannot exist, war will become mobile, and the course of wars in the future will depend on the results of fleet-actions between such land-ships. These land fleets will be accompanied by air fleets, consisting of reconnaissance, photography, artillery observation, bombing and fighting machines as at present.

But it must be remembered that a war is only won ultimately by an army of occupation in the enemy's country. Therefore these land fleets must have behind them a highly mobile army, able to spread rapidly over the country, to take possession of towns and villages, to keep order, and to round up stragglers of the enemy's army. Such a mobile army will naturally be conveyed largely by motor vehicles, but these vehicles will be limited in action by existing roads. Therefore, in order to keep pace with the land fleets and to get direct across country, the bulk of the army must necessarily consist of cavalry.

Owing to the extreme mobility of the main forces, trench-digging and wiring will be impossible, or so nearly so that it will not be worth while. Therefore there will be an immense amount of open fighting between armies of cavalry, with aeroplanes mixed up in the scrap from above.

So we come back to the old-fashioned idea that the cavalryman is the real soldier. Trench warfare is merely a passing phase—a throwback to the days when primitive man defended himself in a cave because he was ignorant of military science. When war again becomes mobile there will again be an opportunity for real generalship, and the cavalryman, whether as general or trooper, will come into his own, for the quick-thinking brain of the horseman will be more pre-eminent than ever.

Aircraft, the latest arm, produced the deadlock of trench warfare by letting opposing commanders know too much. Tanks, the product of an aeroplane designer, showed the way out of that deadlock. Tanks and aircraft together now clear the way for cavalry, the army of future war.—C. G. G.

THE AIR FORCE BILL IN THE HOUSE OF LORDS.

On November 21st the Earl of Crawford moved the second reading of the Air Force Bill. He regretted profoundly that the measure had not been presented to their lordships by Lord Cowdray, and said the Bill marked a notable stage in the progress and evolution of our Air Service, and had been rendered possible by the organising power, the experience in handling big things, and the knowledge of men possessed by Lord Cowdray.

Viscount Cowdray expressed his whole-hearted support of the Bill, which, he said, was the outcome of much anxious thought and preparation. If the Air Forces were to remain as units only of the two great fighting Services, which God forbid, the proposed legislation was not necessary, but if they realised that an independent Air Force was needed with full power, complete organisation, and equal rank with the Army and Navy, the Bill should receive their full approval.

For the last three months numerous committees consisting of experts in their various departments had been constantly thinking out various problems connected with the creation, establishment, administration, and discipline of an Air Force, and the setting up of an Air Council. The transfer would be gradually effected, and he did not think, if care were taken, that it was possible for any disorganisation to occur during the transition period.

The creation of the new Air Ministry would not affect the executive command at present exercised by Sir David Beatty and Sir Douglas Haig over the Air Forces of the Fleet and Army. The only difference would be one of administration.

Whereas hitherto the Flying Services had been administered by two Departments, the Admiralty and the War Office, and equipped under a complicated system in which no fewer than four departments were involved, in future they would be administered by a single Department, and equipped by the Ministry of Munitions on the requisition of the Air Minister.

From an intimate business connection of thirty years with our great Ally the United States, and from the acquaintance with the commercial and industrial possibilities he had acquired at the Air Board, he had a firm conviction that with the passing of the Bill we should be more than able to fulfil our own expectation for ourselves and those of our Ally for us.

Viscount Haldane bore testimony to the great service which Lord Cowdray had rendered to the country. The enormous development of the Air Forces in this war, and the immense importance which they possessed for the future, made it essential that they should recognise that it was not possible for the Army and Navy to undertake the administration and organisation. Therefore he entirely agreed with the principles of the Bill.

The crucial clause of the Bill was Clause 8, which set up a Council. Everything depended upon it. It was absolutely essential that the chiefs of the staff should work in close co-operation with the chiefs of the staffs of the other two Services. The Air Force was going to play a tremendous part in war, though he could not say that it was going to supersede other Services to the extent which some people thought.

His great anxiety about the new force was not how it was to be organised, not how it was to be administered, but how the higher command would be brought into intimate and continuous relation with the higher commands of the Army and Navy.

Lord Tenterden said it was important to know whether the step proposed portended a very large increase in aircraft, so that we should not have a force inferior to any similar force in any other country. He trusted that an assurance would be given by the Government that a scheme was in hand for increasing our output of aircraft, without which the establishment of the proposed Air Council would be of little effect.

Lord Erskine remarked that supremacy in the air was of the most vital importance at the present moment, and any measure which would bring about that supremacy would certainly be warmly welcomed. This Bill would do away with any slight friction which had arisen between the naval and military branches—friction the amount of which, in his opinion, had been greatly exaggerated.

Knowing that the Germans were making almost superhuman efforts to increase the efficiency of their air service, and realising to what a large extent the war would be decided by the Air Forces, he thanked the Government for having brought in the Bill.

The Marquess of Salisbury intimated that some noble lords might wish to avail themselves of the opportunity afforded by the procedure of this House to have a general discussion upon the Bill on going into Committee.

Earl Russell drew attention to a provision in Clause 12 of the Bill that the Army Act, subject to the necessary modifications, should apply to the Air Force, and should take effect as a separate Act of the present Session. This creation, by a single clause, of a separate Act to be known by a distinctive title he regarded as a constitutional innovation.

Earl Curzon said that the Bill was the result of a concordat which had been arrived at between the two great Departments of the State. The result was very largely due to the activity and influence of General Smuts, who was charged by the War Cabinet with the investigation of this problem.

General Smuts had been in constant co-operation with Lord Cowdray, and it was largely due to the advice he had tendered and the influence he had exercised that the present arrangement had been arrived at.

They all deeply regretted the severance by Lord Cowdray of his connection with the Air Board. His lordship had brought to the service wide experience and great powers of organisation, and the fact that the Air Ministry was now being set up by general consent and without friction was largely due to him. (Hear, hear.)

As to the increased production of aircraft under the auspices of Lord Cowdray, he wished he could give the figures. He could not, however, without giving information to the enemy. It was sufficient to say that the expansion had been remarkable and almost prodigious. If they cast their eyes into the future and contemplated the war lasting, as seemed likely, well into next year, the figures of production would be such as to give a feeling of sure confidence not only as to our advantage over the enemy, but as to our overwhelming superiority.

This was not only a war measure, but a post-war measure. Astonished as they had been by the development of the Air Service in the war it was not to be supposed that the development would cease with the war. It would remain a permanent and material part of our organisation.

The Bill was then read a second time.

As usual, the House of Lords has shown the House of Commons how a debate should be conducted. The difference in tone and in common sense between the two Houses is becoming more noticeable day by day. It would seem that as a general rule if a member of the Upper House has nothing sensible to say he says no-

thing, whereas in the Lower House the less a member has to say the more he says it.

Lord Cowdray's explanation that the executive command of the Air Forces of the Fleet and Army would not be affected by the change, would appear to indicate that things will remain very much as they are, during the war at any rate, except for the creation of a third branch of the Air Force, intended for air operations only. Thus it would seem that this paper was probably correct a fortnight ago in assuming that the R.N.A.S. and R.F.C. will continue to exist as the Naval and Military sections of the Air Force, while a third branch—possibly the Imperial Air Service—is built up for its own special job.

The tribute paid by Lord Haldane to Lord Cowdray was well deserved and well expressed. In years to come, when people are able to look at this war in its true perspective, Lord Haldane will be recognised as one of the greatest statesmen of his day and one of the deepest thinkers. At present, perhaps, it is sufficient to say that if Lord Haldane's schemes for the British Army had been carried out, and had not been mangled by politicians who wanted to acquire personal popularity by spending the Army's money on so-called social reforms—such as old-age pensions and State insurance—the disaster at Mons and the subsequent horrors of the British Army's first winter in Flanders would have been impossible.

Therefore, Lord Haldane's warning as to the importance of close co-operation between the chiefs of the Air Force staff and the chiefs of the other two Services is worth noting for future reference. Lord Haldane knows more than most people about what goes on behind the scenes in the Services, and his phrase is full of meaning.

It is curious that he should be anxious as to how the higher command should be brought into intimate and continuous relation with the higher commands of the Army and Navy, for it will be remembered that when so very different a person as Mr. Pemberton-Billing proposed that the Navy and Army should each have representatives on the new Air Council, with power to vote, the proposal was treated with contempt by Major Baird, and one would scarcely place Major Baird on the same level as Lord Haldane either as a statesman or in knowledge of the internal affairs of the Services, despite his various official aerial positions.

The evidently sincere desire of the Peers that this country shall have an overwhelming air fleet, and shall hold the mastery of the air—Sir Douglas Haig's phrase—both during and after the war is most encouraging, for however the rabble in the House of Commons may juggle with the affairs of the Empire, the course of events depends chiefly and ultimately on the sound common sense of our hereditary legislators and their more recently appointed colleagues in the Upper House.

C. G. G.

THE AIR MINISTER.

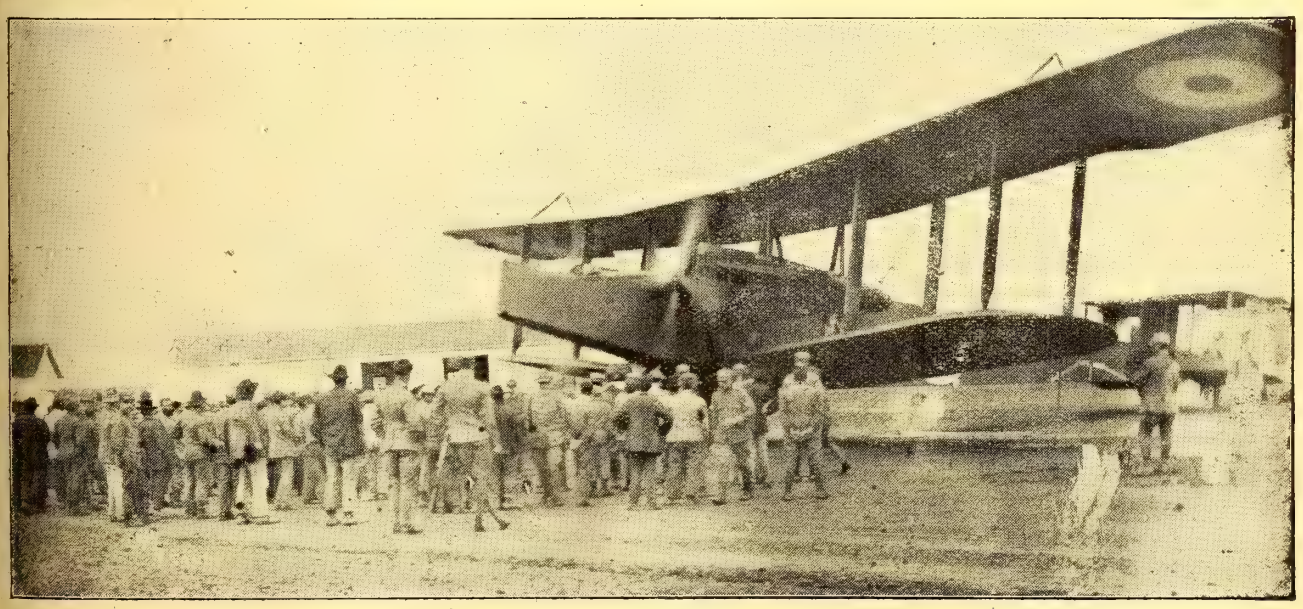
It was announced officially on November 26th that the King has been pleased to approve of the appointment of Lord Rothermere to be President of the Air Council.

Harold Harmsworth, Baron Rothermere, was born in 1868, and is a younger brother of Viscount Northcliffe. They are the sons of the late Mr. Alfred Harmsworth, formerly of Chapelizod, County Dublin, and were educated at the Erasmus Smith School, commonly known as "High School," in Dublin.

In the early days of Mr. Alfred Harmsworth's journalistic enterprises Mr. Harold Harmsworth was associated with him, and together they built up that organisation which is commonly known as "Carmelite House," with all that it connotes. Of late years Sir Harold Harmsworth, Bart., somewhat dissociated his business interests from those of Baron Northcliffe, and became a newspaper proprietor on his own account.

He was created Baron Rothermere in 1914, and in October, 1916, in consequence of contract scandals, he was appointed Director-General of the Royal Army Clothing Department in Pimlico. It is said that excellent results in this department are due to his business ability.

In commenting on Lord Rothermere's appointment as Air Minister, the "Daily Express" says:—"His career as a business man has been no less successful than Lord Northcliffe's, but Lord Northcliffe, as a wielder of journalistic thunderbolts, attracted the public attention and Lord Rothermere escaped into the quietude he himself preferred." Referring to the early work of the brothers, the same writer says:—"Lord Rothermere was



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the director of finance while his brother planned the journalistic campaigns. Lord Rothermere has a genius for business. . . . With Lord Northcliffe the ownership of newspapers has been a magic adventure. To Lord Rothermere it has been a triumphant business career. He founds and controls newspapers as another man establishes and runs a great manufactory. He aims at producing the largest quantities of the most saleable goods."

These businesslike qualities augur well for his success as Air Minister, provided always that Lord Rothermere remembers that quality and quantity are both essential in aircraft. He must be careful not to permit his personal predilection for high quality to be influenced by the public demand for sheer quantity. One gathers that Lord Rothermere not long ago founded a Chair of English Literature at Cambridge University and that he also owns the "Daily Mirror," so that it may be well to point out that quality and quantity in aircraft cannot be so entirely dissociated as are literature and journalism in printed matter.

Hitherto one has not heard of Lord Rothermere taking any personal interest in aeronautical affairs. He has, however, shown an interest in Mr. Winston Churchill, as is proved by his defence in the "Sunday Pictorial" of Mr. Churchill's doings when First Lord of the Admiralty—a point in the said defence being that Mr. Churchill was responsible for the raids on Zeppelin bases in 1914. This was a very good point, in view of the fact that such raids, though always possible, have never been repeated.

Knowing Mr. Churchill's still intense keenness for all things concerned with air war, assuming the personal friendship of Lord Rothermere and Mr. Churchill, and recognising that the success of the Air Council will depend very largely on the hearty co-operation of the Ministry of Munitions, one is encouraged to hope that Lord Rothermere's appointment may be attended with success.

One would naturally have preferred an engineer rather than a business man, especially a newspaper man, for such a job, but in Sir William Weir we have a most able engineer in charge of supplies, and in the Technical Department there are a number of very capable people to watch over design and material, so Lord Rothermere's ability purely as a business man may find plenty of scope in putting right matters which are very wrong indeed in other departments. Also, it seems unlikely that Lord Rothermere will want to interfere with the Naval, Military or Aerial work of the Air Council.

In any case he may be accepted without prejudice as a man who intends to do his best, and one bespeaks for him the loyal co-operation of all those subordinates who have it in their power to make or mar his administration.—C. G. G.

THE COMMAND OF THE AIR.

At a conference held on Nov. 20th at No. 10, Downing Street, between the War Cabinet, the Heads of the Chief Government Departments concerned, and certain members of the Mission from the United States of America now in this country, Mr. Lloyd George in the course of his opening speech said that everybody who had followed the war from the outset realised how vital was the command of the air. In the battle line it was almost as essential as the command of the sea.

He believed that the people of the United States possessed in an unusual degree the qualities of enterprise and daring necessary to the creation of successful aviators. The American climate also lent itself to the development of an air service, because it was clearer and more equable than the climate of the British Isles. This was of special value, because the training of pilots, the creation of flying units, and the building of aerodromes were as essential to the creation of a true Air Service as the building of aeroplanes themselves.

ROYAL VISITS.

The King visited the National Physical Laboratory on Nov. 23rd, and an aero-engine instructional workshop, which the Ministry of Munitions has set up in the district of Twickenham, as reported in the "Court Circular."

At the National Physical Laboratory His Majesty witnessed the testing of gauges for aeroplane parts, and then, in another department, he saw the even more delicate operation of gauging the gauges.

In another department His Majesty and others occupied an enormous "wind channel," during the carrying out of actual tests of aeroplane parts. In this case an electrically actuated gale of fifty miles an hour was applied to these models, and their behaviour and that of their parts indicated precisely what (was hoped) would be the behaviour of the corresponding full-sized machines and their respective parts.

On completing his tour the King warmly thanked Sir Richard Glazebrook and his assistants.

On Nov. 26th the King visited the works of Gwynne's, Ltd., and those of D. Napier and Son, Ltd., in the London district. At Gwynne's, Ltd., His Majesty witnessed the grinding of cylinders for aero-engines, and there chatted with six of the longest service men in the works. One of these had been employed for over forty-seven years.

At one point the King encountered a lady well known to him. This was Lady Victoria Bentinck, daughter of the Duke of Portland, and in her immediate neighbourhood other ladies were working, among them Lady Sibell Pierpoint, Mrs. Brownlow, an ex-professor of Girton College, and Miss Katherine Gwynne and Miss Mary Gwynne, daughters of the principal of the firm.

His Majesty's next visit was to the Napier factory, where a guard of honour was supplied by the workmen. Noticing that on the left of their line was a man wearing a miniature V.C., the King advanced with a smile, remarking, "I see we have met before," and shook hands with the wearer of the decoration. The man was Corporal Jarvis, Royal Engineers, and as he won his V.C. as far back as August, 1914, he is probably justified in his claim that he was the first non-commissioned officer to receive the decoration at the King's hands during the present campaign.

The members of the Royal party devoted a good deal of attention to a large and powerful new engine which is now being made in large quantities. It is a 12-cylinder engine, and, although it is capable of developing about 500 h.p., its total weight is alleged to be somewhere between 600 lb. and 700 lb.

THE AERONAUTICAL HISTORY EXHIBITION.

Those who have not seen the numerous interesting exhibits at the People's Palace, Mile End, organised so ably by the Countess of Drogheda, should make a point of doing so before the end of next week. Aircraft workers in particular should make a point of comparing the workmanship of the Sopwith "Pup," and the Albatros and Halberstadt machines on view there.

Those who wish to see the show at ease are advised to go there in the morning, as the interest is so great that the hall is apt to become crowded in the evening. The fact that 100,000 people have visited the show in a fortnight is proof of the interest taken in aviation by the intelligent workers of the East End.

A humorous person concerned with the show remarked, in reply to a question as to the size of the crowd one day, that certainly the air did become a trifle dense, for on examining the pilot-tube air pressure indicator on the Sopwith during the evening he found it had gone up to 134 miles an hour.

The People's Palace is only three or four minutes' walk from Mile End Road Station, which can be reached direct by District Railway from Charing Cross, or any of the Thames-side stations for threepence. Admission costs sixpence in the morning, so a visit to the show is not expensive.

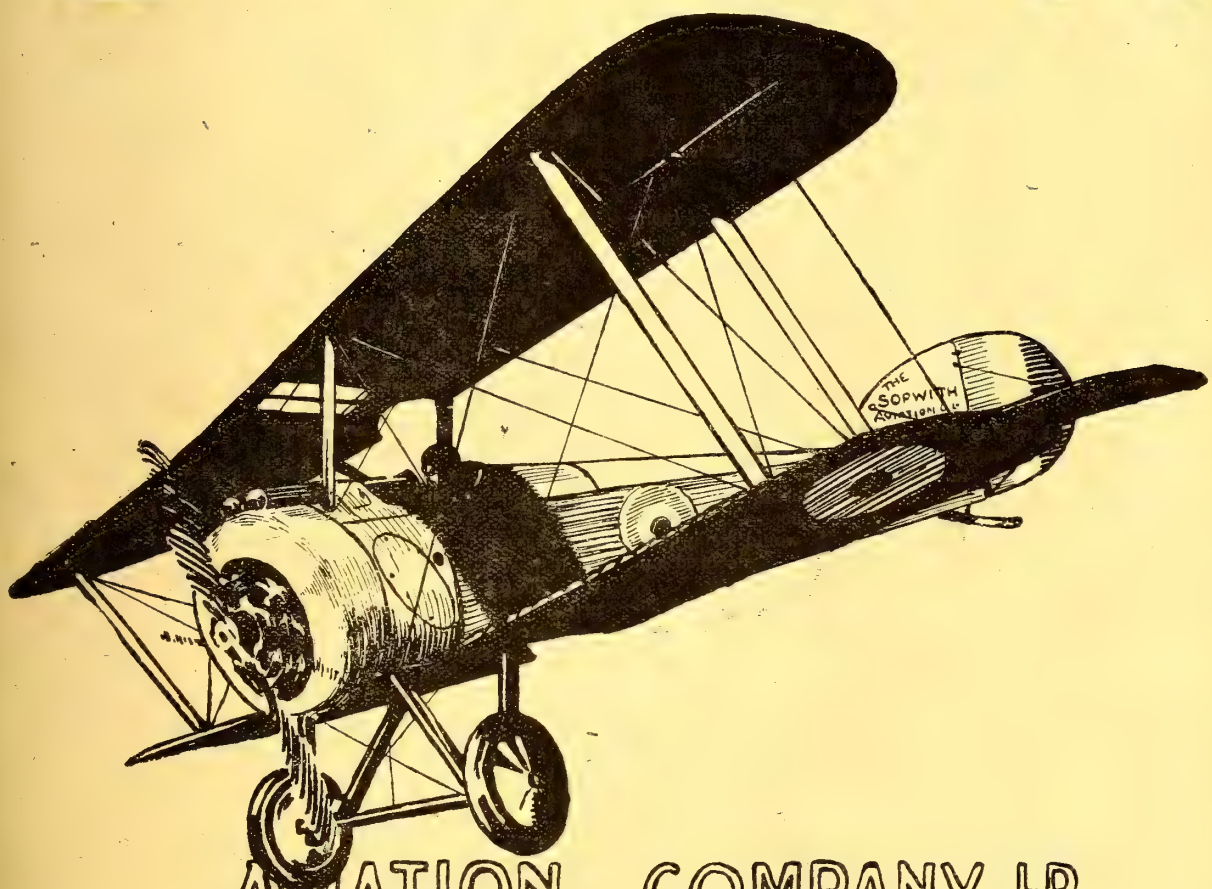
BARON VON RICHTHOFEN'S OPINION.

General von Ardenne, who is sending the "Berliner Tageblatt" a series of letters from Flanders, refers, under the date of Nov. 9th, to a visit to the well-known German aviator Baron von Richthofen. He says that von Richthofen "spoke without anxiety about the mass-production of some 20,000 American airmen," and that he "thinks the Germans can reckon upon about 25 per cent. [of the machines] becoming unfit for use during the long journey." Baron von Richthofen said it would be impossible to produce 20,000 experienced pilots, and that the Americans, especially at the beginning, would lack the ability to judge conditions in the field. Baron von Richthofen and his brother said that the English aviators are better than the French, but that they were now less daring than they were.

General von Ardenne notes, as an innovation, that the German squadrons, with the help of wireless telegraphy and various kinds of signalling, are now always ready to start from their front lines, and so avoid the fatal delay involved in starting from a German aerodrome when enemy squadrons come over the German lines.

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The events of nights not long passed have widened the circle of people who know from first-hand experience that we are at war with Germany.

Many bombs have been dropped in London up to the present, but few have fallen in a way so eminently suited for exhibiting, without doing serious harm, the effect of the detonation of modern high explosives, as has one which came to ground recently.

The word "detonation," as opposed to "explosion," is used purposely, for there is a considerable difference between the two. An explosion is merely the rapid expansion of a solid body into gases at high temperature; a detonation is much more violent than an explosion, and consists in the actual chemical dissociation of the substances with which the bomb is filled.

To give a simple analogy between the two one might say that any person who gets in the way of an explosion receives a good hard push. If this is assumed to be of the nature of a swinging blow from a sackful of oats, than the effects of a detonation upon anybody who is so unfortunate as to be within its radius would be more like a very hard kick from a very strong mule.

Pas de Gene.

Notwithstanding the disruptive and destructive force of these aerial visitors, one should not allow oneself to consider them too seriously. The question should be looked at in the light of the rules of simple arithmetic and the laws of probability.

A calculation of the chances, though made upon somewhat inexact and loose premises, may be of some interest.

The area of London—the word being used in its greater sense—is about two hundred square miles. The radius of action of a bomb (other than the very big ones which are occasionally used), as far as the dangerous effect of the blast is concerned, is not much more than 40 yards. The radius of action of the flying fragments is rather difficult to arrive at, but an approximation can be made.

Flying Fragments.

Some of the fragments travel perhaps 400 yards, some of them very much less—all starting on their flight at different angles of inclination to the horizontal.

Let us assume a mean path for all fragments travelling thus in a radial direction. Let the inclination of this mean path be at 45 deg. to the ground.

These fragments are only dangerous to persons standing up from the moment that the explosion takes place until they reach a height of, say, 6 feet—practically the limit of height of a man. After passing this point they become innocuous until they reach another point, this time in their downward path, at which they would catch a man on the top of the head.

A simple calculation will show that the average horizontal length of the danger area from the centre of the burst along the ground to the man's position is at the most 15 feet.

Now, persons only 15 feet from the bomb would be injured by the blast in any case, and so injuries by fragments need not be taken into consideration for them.

The second dangerous zone—assuming an average angle of descent of 3 in 1—would have a horizontal base line of only two feet. This means a belt 2 feet wide and averaging 200 yards in diameter, of which the superficial area is approximately the length ($200 \times 3 \times \pi$) feet, multiplied by the breadth, which is 2 feet.

$= 200 \times 3 \times 3.14 \times 2.$

$= 3{,}800$ square feet.

$= 425$ square yards.

Now the area of the zone of blast (which includes the first zone of fragmentation) = area of a circle of 40 yards radius.

$= 40 \times 40 \times \pi.$

$= 5{,}300$ square yards, approximately.

Therefore the combined dangerous area

$= 425 + 5{,}300.$

$= 5{,}725$ square yards.

The combined area of the two zones is therefore equal to the area of a single circle of approximately 43 yards radius. To allow for other eventualities, not amenable to a rigorous mathematical treatment, we have taken 50 yards instead of 42 yards as the radius of the danger area.

The Size of a Danger Area.

Therefore, having struck an average, we may say that the dangerous area of a bomb which falls in the open is a circle of diameter of 100 yards, i.e., 8,000 sq. yards, nearly. If we divide 200 sq. miles by 8,000 sq. yards the answer is 75,000 in round numbers. This means that there are 75,000 danger areas in London, each of 8,000 sq. yards, in which a bomb may fall.

If one happens to be in the particular 8,000 sq. yards in which the influence of the fallen bomb is felt, one is liable to suffer more or less. It is hardly conceivable that everyone inside the 50 yards' radius would be killed—probably only one-half of the people within the area would be killed or injured. Now, this paragraph begins with the word "If." Uncertainty is therefore indicated.

The Odds Against.

As there are 75,000 areas in which a bomb may fall and as, by a merciful provision, one can only be in one place at the same time, it is clear that the chances of being in a smitten area are 1 chance in 75,000. Expressed in mathematical parlance, this is $\frac{74{,}999}{75{,}000}$ of an uncertainty or, in more acceptable terms, $\frac{1}{74{,}999}$ of a certainty, of being in the smitten area. Or, putting it in the language of the racecourse, the odds are "74,999 to 1 against."

Using more convenient numbers, this can be called 75,000 to 1 without any great sacrifice of accuracy. Now, the chance of the individual being damaged by the fall of a bomb in his particular area is, as pointed out before, an even chance, or $\frac{1}{2}$ of a certainty, this therefore reduces the chance of being damaged by any one individual bomb to 1 chance in 150,000.

These are the theoretical mathematical odds against any individual being damaged by the fall of a bomb *in the open*, and are mathematically accurate as far as the data on which they are built are themselves accurate. It is manifest, of course, that all data in matters of this kind incline towards the problematical.

Now, these figures apply only to those people who inhabit London all the year round; it is plain that those people who only spend a part of their time in London have a still better chance of escaping. For instance, the week-ender who goes away from Friday to Monday—regularly—a most unpatriotic thing to do, it is agreed—is rewarded by running less risk of being blown to pieces. Such are the workings of justice. In his case the odds are $\frac{1}{150{,}000} \times \frac{5}{7}$, or 210,000 to 1! because it is only 5/7ths of a certainty that he will be in London at all.

The Population Question.

Let us now investigate some questions as to the density of the population in London. The metropolis contains altogether nearly ten million people, and as its area is about 200 sq. miles, we find the average density is 1-64th of a person per sq. yard (quite apart from the disruptive effect of bombs).

This equals one person to 64 sq. yards, so that, therefore, on an area of 8,000 sq. yards there should be an average of 125 persons.

From this we can deduce that every bomb which falls in the open ought to kill and injure 62.5 persons, which does not happen in practice, for reasons discussed in the following paragraphs.

The Value of Cover.

All these assumptions have so far ignored the question of cover. It is almost impossible to calculate this with any pretension to actuarial nicety, but the bearing of cover on the risks run can be illustrated by a few figures.

Let us assume that the cover selected is a room 21 feet square. This = 441 sq. feet, or approximately 50 sq. yards. Now, if the side walls of this room are anything like decently built they would give almost complete protection for those inside (neglecting the roof or ceiling altogether) except from extremely heavy bombs bursting very near the walls. Therefore the chance of a direct hit in a room of average size is only $\frac{150{,}000 \times 8{,}000}{50}$, that is to say, 24,000,000 to 1 against a direct hit for any one person in the selected 50 sq. yard area.

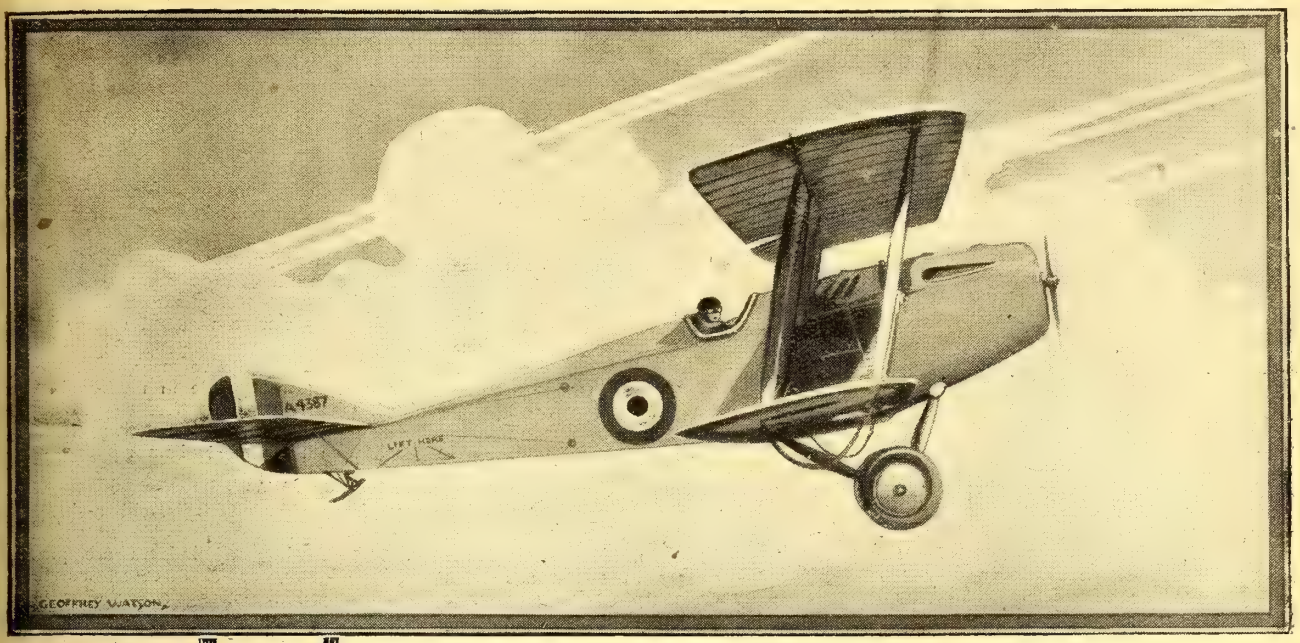
Now these are good long odds, and to obtain them it will surely be agreed that it is worth while to take the trouble of getting inside.

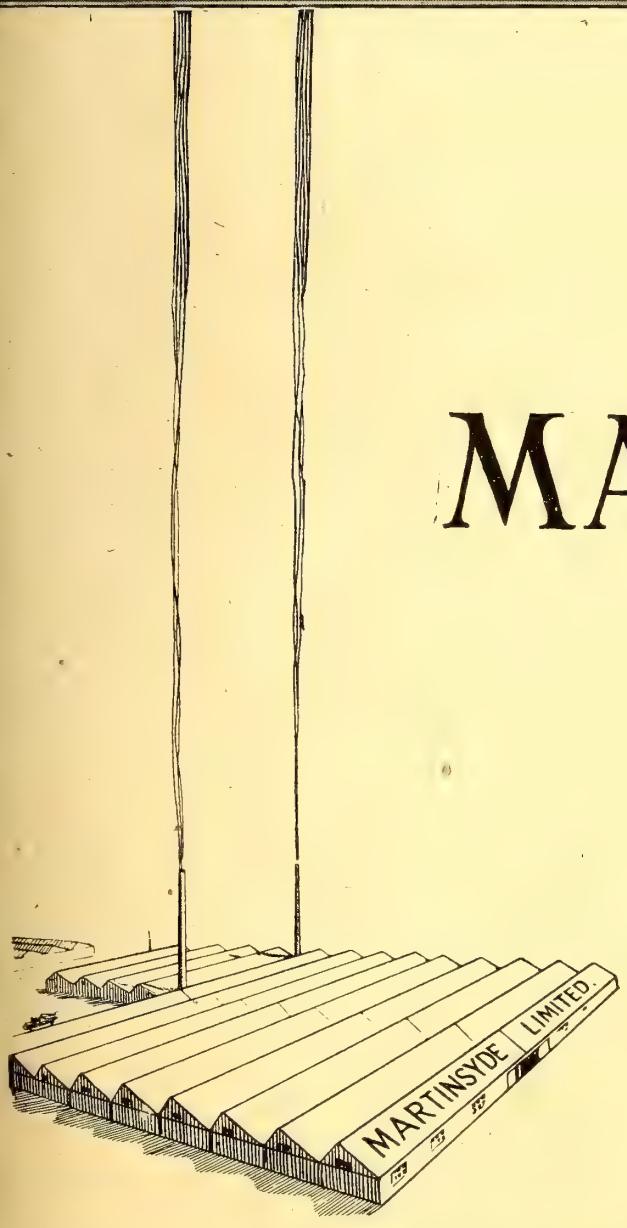
Overhead Cover.

The calculation does not end here, for there are still other factors.

As shown in the preceding lines, those inside the average room only run 1 chance in 24,000,000 of being hit. If this room is in the basement, and has three or four strong floors above it, though the building directly above be hit, it is almost a certainly that the bomb will explode at some distance overhead, and will fail to hit directly, either by blast or by fragments, those inside. Perhaps one could say that the fact of having three or four floors over one's head increases one's chance of escape by at least 3 to 1. This brings the odds up to 96,000,000.

However, if the building is only moderately well built, it is reasonable to suppose that the bomb will not seriously hurt the







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inmates by direct blast or fragmentation. Making allowance for this and for the chance of being knocked over and stunned or bruised by falling material, it would be fair to assume that for persons in a moderately well-built house the odds would be increased by at least 2 to 1—that is to say, they would be 72,000,000 against being hit.

When we come to single-storeyed or two-storeyed houses, perhaps not very well constructed, though often called "desirable residences," the same degree of protection is not afforded, and by retreating to the basement one might only double one's chance, making the odds 48,000,000 to 1.

This closes the case for the advisability of taking cover. If any further argument is necessary to induce those who are in the habit of strolling the streets to remain indoors, it will be sufficient to indicate that as the area of the streets, back gardens, parks, and other open spaces in London is approximately three times the area of ground covered by buildings, and that, therefore, three times as many bombs may be expected to fall on open ground, i.e., streets, parks, squares, etc., as on buildings.

Decreasing Averages.

This article, so far, has only considered the dropping of one bomb. It is not, however, a practical way of treating the question. It would not be extravagant to assume that 500 bombs should be the annual average number dropped on London.

This causes one's chances of being injured to be increased five-hundredfold during a space of twelve months, and this diminishes the odds for the four categories previously mentioned. The various odds under different conditions are tabulated at the end of the article.

The figures there shown may give one the impression that the insurance companies who have been issuing policies at 4s. per cent. should prove a valuable asset to the State as contributors of excess profits; hence, if our German foes only recognised the fact that every time they dropped a bomb they were causing the cash to flow into the National Exchequer they would surely desist from a practice which, whilst it is an enormous expense to them, is at the same time an enormous source of revenue to the British Government.

An Anti-Reprisal Argument.

We should face these occasional annoyances manfully, and should not clamour loud and strong for reprisals; for it is within the realm of possibility that our Government, advised by their keen-sighted financiers, has seen that retaliatory measures of the same kind undertaken against German towns would help to fill the German coffers, and thereby defeat their own ends.

The Manners and Customs of Bombs.

A few facts as to the habits of bombs may be of interest. As a general rule they burst on reaching the first solid matter that they encounter in their flight. If this be the ground, a considerable cavity is usually made, and the result of the detonation takes place upwards and outwards at an angle of about 30 to 40 degrees in the shape of a flattened cone composed of road material, bricks, bomb fragments, and other noxious substances.

Roof materials and similar structures, if decently strong, can be considered to be "solids" as regards bombs. Frequently, however, they do not offer sufficient resistance to bombs to detonate them at once, and the bombs therefore continue on their course until they come up against it on the concrete floor of the basement.

When the explosion happens in the basement, which is fortunately not very often, very severe damage and many casualties may result.

(It was found in the early days of the war that 17 lbs. of gun-cotton, properly placed, was sufficient to raze to the ground 5 workmen's cottages at a time, when built in rows. Seventeen lbs. would be a small bomb indeed.)

Practically all the bombs which are dropped upon this country are, it is believed, contact bombs intended to burst as soon as they hit anything, or perhaps a quarter of a second after striking, so that the interior of houses can be wrecked by the burst taking place inside.

Bombs which burst at a given height above the ground would be extremely suitable for use against people in masses in the open, such as Bolo meetings and peace conferences in Hyde Park, but against people in houses their destructive effect is practically nil as compared with the contact bomb.

Home-made Damage.

The question of damage from our own shells, either shrapnel bullets, splinters, or shell cases, is not amenable to accurate mathematical treatment. Those who stay indoors are practically immune from shell splinters, or shell cases, as their penetrating power is very low, and this strengthens the case for staying indoors.

If one should be so unfortunate as to get caught right out in the open air when bombs begin to fall, it is advisable to lie prone upon the face. Most of the bombs being contact bombs, the path of the fragments is more nearly horizontal than vertical, and one's chance of being injured while lying down is obviously much less than when standing up.

The Greater Risks.

There are also three other risks—really serious ones—which, however, are not covered by the insurance companies in their policies. Firstly, there is the risk of taking a chill and contracting pneumonia while squatting on the coal or cowering amongst the beer bottles. This makes it extremely necessary to augment the usual nightwear of either sex, and particularly that of the other sex, by plenty of warm wraps and thick underclothing.

The second risk is that of being squashed in a crush at a Tube Station. Though these tubes give splendid cover from bombs, the chance of being squashed (and of having one's watch stolen) is very considerable.

The third risk is that of catching the germs of a disease. This is not a very formidable risk, and most people would rather catch a germ and miss a bomb, than catch a bomb and miss a germ.

BOMB TABLE—LONDON AND SUBURBS—SEASON, 1917-18.

SCHEDULE OF ODDS.

Position.	ODDS. NON WEEK ENDERS. No. of Bombs per Annum.					ODDS. WEEK ENDERS. No. of Bombs per Annum.					Remarks.
	1	10	100	500	5,000	1	10	100	500	5,000	
Room 50 square yards, in basement of well-built house, 3 good floors and roof.	96,000,000	9,600,000	960,000	192,000	19,200	134,400,000	13,440,000	1,344,000	268,800	26,880	Note.—Street risks compared to shelter risks—3 times as great. Bombs required to injure the whole population if in the open—150,000, all of which would be required to arrive at the same moment, or in a very short space of time to an ultimate increment in population due to annual birth rate, and all of which would have to be distributed with mathematical accuracy over the whole area of London at the rate of one per 8,000 square yards.
Do. do. do. moderately well built, say two floors.	72,000,000	7,200,000	720,000	144,000	14,400	100,800,000	10,080,000	1,008,000	201,600	20,160	
Do. do. do. "desirable residenc."	48,000,000	4,800,000	480,000	96,000	9,600	67,200,000	6,720,000	672,000	134,400	13,440	
Well built room 50 square yards on ground level —no overhead cover.	24,000,000	2,400,000	240,000	48,000	4,800	33,600,000	3,360,000	336,000	67,200	6,720	
In the Open.	150,000	15,000	1,500	300	30	210,000	21,000	2,100	420	42	

Special Note.—The worst risk, *i.e.* 5,000 bombs a year to a non week ender in the open, is enclosed in heavy lines

Those who have comfortable homes, enough to eat, and dry feet, should note this and compare it with the losses among our collosally gallant forces—and not complain.

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[The pending pun about Germs and Germans won't quite come off. (Author). Thank Heaven!—Ed.] [The Editor only says this because he can't bring it off himself. (Author.)]

Repeating the Offence.

The question of the same place being hit two or more times in succession is not uninteresting. The writer has had some experience of this in a different direction.

The suggestion was once made of visiting Monte Carlo, with a friend, to work a "system" and break the bank thereby. However, being of Scottish nationality, and of a cautiously inquiring turn of mind where the "siller" was at stake, his investment in the first instance was limited to the purchase of Todhunter's Higher Algebra at a price of 1s. 6d. (second-hand). After a few days' study of the theory of probability, as expounded in this classic work, it was decided that the system was more dangerous than any other that had yet been invented.

While thus engaged on these researches the chances of consequential events were thoroughly considered. To put it shortly, the chance against two bombs falling on the same area in two consecutive shots is 1 in approximately 5,625,000,000, assuming our area of 8,000 yards to be the unit, and for three successive shots the odds would be 75,000 times as much.

Now, this indicates that the odds against three bombs falling on the same place, or any three pre-selected areas, are absolutely colossal, assuming that the same spot is not aimed at every time. It must not be argued that because three consecutive bombs have fallen on the same place that the chances against a fourth one also falling on the same place are in any way altered. The argument is often misapplied at Monte Carlo by people who don't know better, and with disastrous results to themselves. It does not matter how many times a bomb may have fallen on the same area, the chances that the next one will also fall there are the initial 1 in 75,000. Thus, the odds against a consequential run of bombs in the same place do not alter the odds as to where the next bomb will fall. (That was why the writer did not go to Monte Carlo.)

A table is presented herewith, purposely printed in small type so that it may be cut out and pasted inside the hat by those who wish rapidly to calculate the odds under circumstances of emotion when the mental arithmetical faculty is abnormally low.

BOLOISM.

The subtle manner in which the working men of this country are fed with dangerous sentiments is well shown in a cutting from what is apparently a "Labour" paper of some sort. The cutting has been sent without any accompanying letter and is merely inscribed "From a Constant Reader of The Aeroplane." It reads as follows:—

CHIVALRY OF THE AIR.

A Story from France.

"La Nazione," of Florence, has received from Paris the following particulars respecting the funeral of the famous French aviator, Guynemer, who fell behind the enemy lines:

The disappearance of Guynemer was made known throughout the whole of the French air service, but no news of his death was to hand until on one of the French aerodromes a German aeroplane dropped a package. This package contained a uniform, a pocket-case, and a letter. The uniform, which was bloodstained, belonged to the heroic and unfortunate aviator.

In the pocket-case were bank notes.

The letter came from the commander of the German aviation corps on the western front. It contained an invitation to the French aviation corps to come and assist at the obsequies of Guynemer. The most complete security and absolute liberty of passage over the lines of fire were guaranteed, both for the journey out and return. It was expressly stated that the French aviators could fly close to the ground. No shot would be fired.

On the day fixed, at dawn, 15 French aviators, an entire squadron, with a captain at the head, traversed the enemy lines and made for the place indicated in the letter of invitation.

After descending, the aviators, accompanied by their adversaries, made for the village close by where the body of Guynemer lay. In the modest church Frenchmen and Germans joined together in the religious ceremony, which was brief but moving. Wreaths sent, in some cases by the families of the German aviators, were then placed upon the coffin.

In the adjoining cemetery a German officer paid tribute to the fallen aviator. Nor was a tribute of homage to French aviation omitted. The officer declared that German aviation felt itself to be the disciple of the French, who were masters of courage and hardihood in the realm of aeronautics. "Germany," he added, "will never forget Guynemer."

Many eyes were wet. Many were the handclasps when the ceremony finished. Thereupon the guide accompanied the Frenchmen to the field where their machines were which, during the ceremony, had been refilled with petrol, started the engines, and got ready for return.

An hour afterwards the French aviators descended behind their own lines.

Now it so happens that this paper is in a better position than most to discuss this subject, because it has always given the devil his due and has never denied to the German Flying Service proper credit for chivalrous actions such as dropping notes from captured officers and men, or relics of the dead, and so forth. This story is, however, rather too tall to be believed.

It is doubtless true that the late Captain Guynemer's belongings were dropped into the French lines. It is also probable that German aviators sent wreaths to his funeral. It is still more probable that captured French officers were allowed to attend the funeral in person, for photographs of them in company with the Germans present would make good pictures to publish in support of the story told above. It is even just possible that an offer was made to permit one French aeroplane to come over so that one or two French officers could be present, for one has heard authentically of the Turks making a similar offer to the R.F.C. But one cannot quite swallow a free invitation to the French Service d'Aviation to fly over the German lines in numbers, nor can one believe all the stories of German courtesy to these strange visitors, let alone all the guff about "wet eyes" and "handclasps."

One respects the Hun aviator for his skill and solid courage. One admires his High Command for its foresight and energy and organising power. One may even like individual German aviators whom one has met from time to time, like Helmuth Herth, or the late Hans Volmöller, or poor old Römpler, but one still cannot digest all this camaraderie and bonhommie and brotherly love, and so forth, as displayed in the cutting. Moreover, one becomes suspicious at seeing so much attention given to the incident in a paper which is not usually violently interested in aviation.

Then, in searching for an explanation one turns to the back of the cutting and finds this incomplete paragraph:—

JOHN CITIZEN AND THE DUKE OF PORTLAND!

There is another gentleman whom the cartoonist might try his artless art upon when next he is making a picture for John Citizen of a "greedy" brother man. Near Bolsover there lives a wonderful gentleman. He didn't put the salt in the sea, but he put the coal under the earth at Bolsover and other places. His name is Ben Tinck, but in polite society, where cartoonists congregate, he is known as the Dook of Portland.

His ancestor, a Dutchman, came over here with William the Fruiterer, who, like Nell Gwynne, was an authority on oranges. In 1688, when the ballad "Lillibullero" was composed, the first Ben Tinck came over here as page boy to King William. How he and his'n made good use of their position the following will show.

Here, then, is the key to the mystery. The mission of this precious labour paper—its name does not appear on the cutting—is to stir up class hatred. Why so harmless and innocent a gentleman as the Duke of Portland should be selected is not clear, especially as his remote ancestor and William, Prince of Orange, later King William III. of England, were both quite good Germans, or Dutchmen. Still, there you are!

However, having stirred up envy, hatred and malice against the people who find employment for Labour, the paper's other mission apparently is to promote brotherly feeling towards the German officer class, as represented by the Hun Flying Service. It is a pity that the Hun officer class cannot put its heel for a while on the people who run papers of this sort. Then such people would find the difference between the quiet, easy-going, and gallant British gentleman whom they hate and envy because they know they can never approach him in cleanness of life or mind, and the brave but ruthless and bullying Hun officer whom they affect to love and admire.

Has the editor of this paper ever heard of the Zabern incident, or read the book prohibited in Germany, "Im Kleine Garnison"? Or does he know all about Germany really, and is he merely paid by German agents to weaken this country by stirring up class hatred?

THE LABOUR QUESTION.

Sir Auckland Geddes, Minister of National Service, as the guest of the Aldwych Club at luncheon in the Connaught Rooms on Nov. 14th, said, in a speech on man power:—

At the present moment we have people advertising for hands to make metal cigarette cases and to electro-plate cigarette cases, right in the very centres where we are trying to find men of the same class and the same degree of skill perhaps to work on aeroplanes. At the very moment in a certain town, when we are looking for women to make aeroplanes, we have advertisements for girls to dress dolls and to fix wigs on dolls. Dolls versus aeroplanes, and the doll makers able to pay wages on the same scale as the aeroplane manufacturers. That is obvious misdirection of human effort.

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Those who find themselves in London on Sunday, December 2nd, and would like to hear some real music, are strongly recommended to go to the concert in aid of the R.N.A.S. Comforts Fund, particulars of which appear hereunder :—

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Lady Acland. Lady Erskine.
The Rt Hon. Earl Curzon of Kedlestone, G.C.S I., G.C.I.E., &c.
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The Lord Montagu of Beaulieu, Sir Richard Temple, Bt., C.B., C.I.E.
Commander Locker Lampson, R.N V.R. Mrs. Sueter, Mrs. Henry Balfour, Mrs. E. G. O. Beuttler, Mrs. C. H. K. Edmonds, Mrs. E. T. R. Chambers, Mrs Kendal, Mrs. Harry Delacombe, Frank E Rosher, Esq., Chas L. Samson, Esq. Major Alan Burgoyne, M.P., Sir Charles McLeod

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THE GROWTH OF THE R.N.A.S. FUND.

The growth of the R.N.A.S. makes it necessary now to extend still further the activities of the R.N.A.S. Comforts Fund. This fund, it will be remembered, was started at the beginning of the war by Mrs. Sueter, the wife of Commodore Murray F. Sueter, C.B., then Director of the Air Department at the Admiralty. Magnificent work was done by Mrs. Sueter and a few friends in collecting funds and contributions in kind and cash for the comfort of the men of the R.N.A.S.

In those days it was only necessary to provide for a few squadrons abroad and the coast stations. Now there are pretty nearly as many squadron commanders in the Service as there were officers and men together at the outbreak of war. The R.N.A.S. is so scattered over the world that the task of providing them with the comforts which they so much require has become very great.

It has been said that the men of the R.N.A.S. are so well paid that they can very well afford to supply themselves with such things as warm woolly garments and small luxuries in the way of food, and with games with which to pass winter evenings when not on duty, and that there is no deed for them to be supplied out of public funds. These arguments are quite false, because men on seaplane carriers and coastal stations far away from the nearest town, and men on active service in France or in the Balkans through the winter, cannot possibly buy things, even if they could spare the money from what they want to send to their families at home. Therefore, it is very right and proper that the fund should be supported by everybody connected with aviation. I therefore venture to make this special appeal to the readers of The Aeroplane to do all they can to help the fund.

Officers of the R.N.A.S., whether at home or on active service, are reminded that each one of them must have a mother, or a sister, or a wife, or some charming young woman who is interested in him, and that he ought in the interests of his men to persuade one or more of these good ladies to take an active interest in the fund. I have found that a very cogent argument to induce the womenfolk of the R.N.A.S. to interest themselves in the fund is that the lives of the pilots depend on the mechanics being warm and well-fed and happy.

A half-frozen and thoroughly miserable mechanic is not going to do his work well, and if he does his work badly the chances are that the machine on which he is supposed to be working will ultimately come to grief in the air. Therefore, by supporting the fund, either by making garments for it or by collecting money for it, the feminine admirers of the Service will be actually assisting in making safer the lives of those who fly. I trust that every officer in the Service who reads these notes will make a point of putting this argument before his womenfolk, and asking them to work for the fund.

The offices of the fund have been moved to 25, Victoria Street, London, S.W.1., and the joint hon. secretaries are Mrs. C. H. K. Edmonds and Wallace Braby, Esq., to whom all communications should be addressed. The hon. treasurer is Sir Charles C. McLeod, and the bankers are the London City and Midland Bank, Ltd., 129, New Bond Street, W.1.

Contributions in kind should be sent to the hon. secretaries, and contributions in cash should be sent to the hon. treasurer.

The fund has now acquired quite a number of eminent patrons, these being Her Grace the Duchess of Sutherland, Lady Acland, Lady Erskine, the Rt. Hon. Earl Curzon of Kedleston, G.C.S.I., G.C.I.E., etc., the Rt. Hon. Lord Sydenham of Coombe, G.C.S.I. G.C.M.G., G.C.I.E., Rear-Admiral Mark E. F. Kerr, C.B., M.V.O,. and a new Committee has been formed consisting of Mrs. Sueter (President), Mrs. E. G. O. Beuttler, Mrs. C. H. K. Edmonds, Mrs. E. T. R. Chambers, Mrs. Kendal, Mrs. Harry Delacombe, the Lord Montagu of Beaulieu, Sir Richard Temple, Bt., C.B., C.I.E., Major Alan Burgoyne, M.P., Commander Locker Lampson, R.N.V.R., Frank E. Rosher, Esq., Chas. L. Samson, Esq.

Those who are not directly connected with the R.N.A.S., and who are merely interested in the Flying Services, will do well to remember that much of the best work of the R.N.A.S. is not mentioned in communiqués, because it is not wise to tell the enemy precisely what the R.N.A.S. is doing. In the meantime one may say that the people of this country owe a goodly share of their food supplies to the activities of the R.N.A.S. against German submarines. Therefore, it is not asking much to request all readers of this paper to do their best to assist in making the R.N.A.S. Comforts Fund a success.—C. G. G.

GERMAN AEROPLANE DESIGNERS.

A correspondent in a neutral country writes as follows :—

The September issue of the German aviation paper, " Deutsche Luftfahrer Zeitschrift," publishes an article on single-seated fighting aeroplanes, in which the following phrases appear :— " The demand for surpassing the ceiling of the enemy aircraft made it necessary to increase the area of the aeroplanes, this being, however, possible no further in the monoplane model. Thus the small-dimensioned, light biplanes were produced, keeping the monoplane body, and here again Fokker turned out one of the must successful types, differing from the other fighting biplanes by obtaining lateral control through warping against the ailerons of the others.

"The first Fokker biplane fighters had two sets of struts between the planes on each side of the body, but even though all parts were built light and small, our enemies, demanding no such high safety figures as we, turned out fighting planes which were, owing to their smaller weight, equal to our aircraft, at times even surpassing them.

"This led to re-designing, when but one set of plane struts was employed. Thus the head resistance was also reduced, and the Fokker and Albatros, one-set strut biplanes, are still the most employed fighting aeroplanes. The competition with the aeroplanes of the enemies, steadily increasing in performance, has forced the German designers to shape all details in the fighting biplanes to least weight and highest reduction in head resistance, the foremost results being building the engines into the bodies, which have taken the shape of the torpedo, another object being to reduce the rudder and elevator areas to a minimum, some designs doing away even with fixed tail planes and fins, as in the Halberstadt type."

THOSE ELECTRIC BOATS.

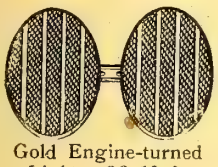
The recent announcement by the Admiralty that the Royal Navy had caused the destruction of four electrically-controlled enemy vessels has been supplemented by additional semi-official information that these vessels are escorted by a seaplane. This statement lends aeronautical interest to the proceedings.

It is stated on good authority that the boats are merely fast motor-launches, and are controlled by wires from the shore, and not by wireless from the seaplane. Thus these vessels seem to be controlled precisely as was the original Brennan torpedo. Nevertheless, the movement should be watched with the closest care.

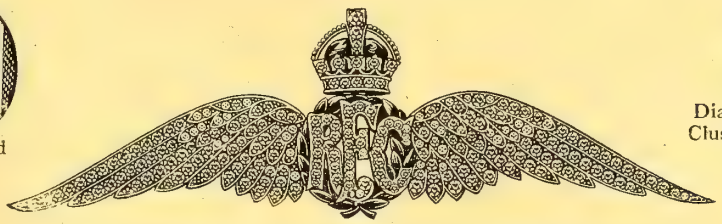
There seems no reason why a marine vessel should not be controlled on a practical scale by wireless from a seaplane, and if this can be done why should not an aeroplane control a Zeppelin loaded up with bombs, and carrying no crew? Long before the war a toy airship was exhibited at various music-halls, wherein it was steered and controlled in all directions by wireless.

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LOW-FLYING AEROPLANES.

According to the "Times" correspondent with British Headquarters, the "low-flying" squadrons of the Royal Flying Corps made the most of their time during the recent operations.

He speaks in praise of all their work, and says that our men are incomparably more daring than the enemy aviators, and habitually show boldness and individual originality of which the Germans never dream.

British pilots were continually rushing into the fight across "No Man's Land" at altitudes of 30 and 50 feet.

Friday was the first fine sunny day during the attack, and for the first time German aviators appeared, and tried to make some show at emulation.

One British pilot went to the aid of some tanks which were held up by a line of guns and large numbers of enemy infantry, taking deliberate aim with bombs at each gun from an altitude of 50 feet, and then turning round and scattering the infantry with his machine-gun, and enabling the tanks to proceed.

During the first few days the condition of the air encouraged these manœuvres, the air being so misty that it was necessary to fly at altitudes of from 50 to 150 feet in order to be able to see anything at all.

The retaliation on the part of the enemy with machine guns was fierce, and one young officer was shot down three times in two days, but managed on each occasion to land on our side of the line.

Again and again pilots used up bombs and ammunition, and returned home, shouting as they landed for more.

One story is worth repeating as it stands. "You ought to have heard him curse," said an officer of the R.F.C., "when I told him his machine would not go half a mile. 'Well, give me the —— bombs and let me go the half mile and see,' was all he replied."

A tragic tale is that of another man who found four German machine-guns in action, and they all turned on him. He charged them, and dipping close to the ground, silenced three of them in passing. As he rose on the farther side he put his thumb to his nose, and shouted rude remarks at the remaining machine gunner. That was mere ὕβρις which the gods always punish. At that moment a bullet from that same machine-gun shattered the offending hand, and he had to go home leaving the last of the four machine gunners in possession. To-day he is being unmercifully chaffed by his comrades, who tell him it is a lesson to be polite even to the rudest Boche.

One of our men who was obliged to come down in "No Man's Land" took a rifle from a dead German lying near, and with it stood off a party of Germans who came to take him, and so backed into our lines.

The "Morning Post" correspondent tells how one officer descended in our lines with his machine literally shot to pieces and with ten bullets in his clothes.

Another pilot who was overturned by a shell fell into "No Man's Land," and acted as a stretcher-bearer for the rest of the day. One pilot who himself landed upside down as the result of his machine being riddled by bullets was just in time to pick himself up and go to the help of another who was badly injured.

Earlier in the battle a pilot dropped a couple of twenty-five pound bombs plumb into a column of marching Huns, and when the stampede was over he saw a couple of considerable heaps of grey bodies around the holes the missiles had torn in the road. Another young officer swooped to within 150 ft. of an aerodrome, completely wrecked a hangar, and pumped a couple of hundred rounds into five machines which were ranged in the open surrounded by mechanics. As if this were not sufficient, he chased three large transport wagons, causing the first to stampede, killing three horses of the second team and leaving the third overturned in the roadside ditch.

AIRCRAFT IN THE HOUSE.

On Nov. 22nd **Major Baird** (Rugby, L.), replying to **Mr. Harcourt** (Montrose Burghs, L.), said:—It is proposed to adopt a distinctive uniform for the Air Force, but this uniform will not become compulsory until sufficient time has elapsed for the old uniforms to be worn out. It is not yet decided whether the new uniforms will include a change of colour.

[What a motley mob the Air Force will be while the old uniforms are being worn out!—Ed.]

On Nov. 21st the Chancellor of the Exchequer (**Mr. Bonar Law**), asked by **Mr. King** if he would say on what date Lord Northcliffe was most recently invited to take charge of the new Air Ministry; whether the resignation of Lord Cowdray had been accepted; and whether a new Air Minister had been appointed, said:—The communication between the Prime Minister and Lord Northcliffe was verbal, and I cannot give the exact date of the conversation. The answer to the second part of the question is in the affirmative, and to the third part in the negative.

Mr. King: Can the right hon. gentleman say within a week or a month, or two months, when this last invitation was verbally communicated?

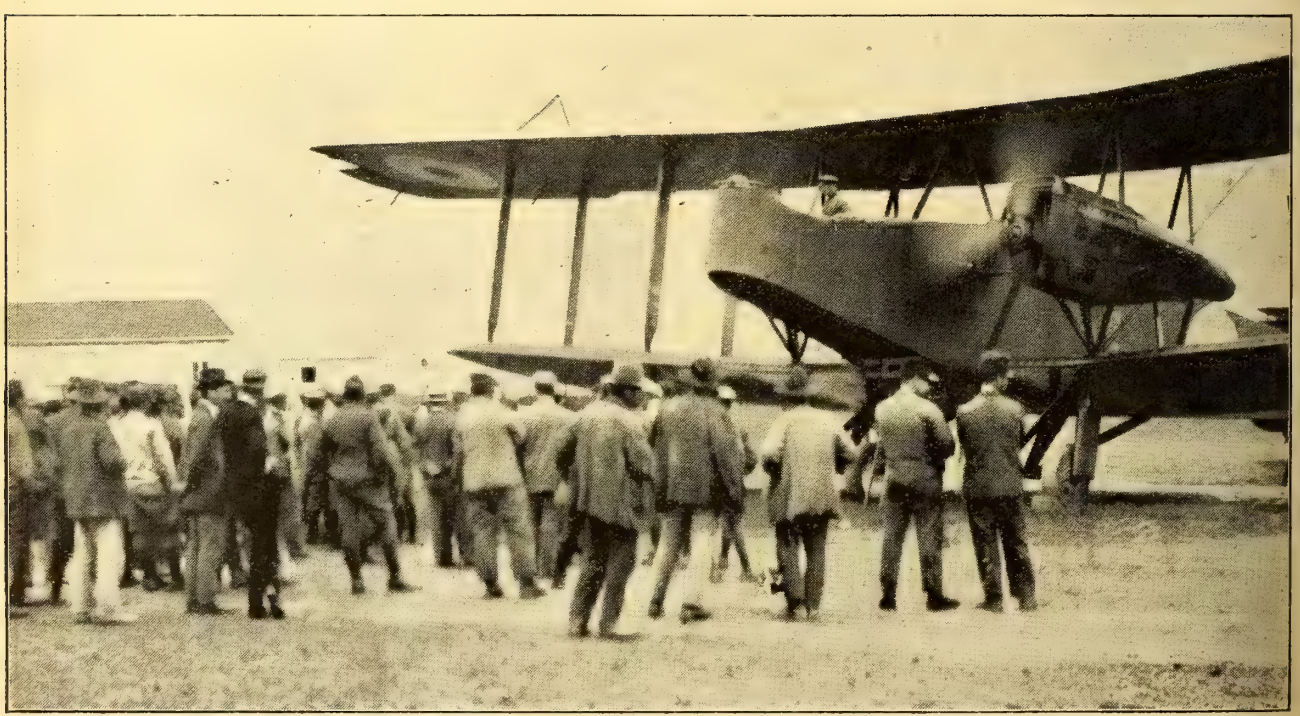
The Chancellor of the Exchequer: I do not think it is necessary to say it, but it must have been a more recent time than that, as Lord Northcliffe has only recently arrived from America.

Mr. Hogge: Will the Prime Minister's letter to Lord Cowdray be published?

The Chancellor of the Exchequer: I do not know that. I have not discussed the matter with the Prime Minister.

Mr. Outhwaite (Hanley, L.): Can the right hon. gentleman say whether Lord Northcliffe refused to take office because of the incompetent and tired Ministers in the Government, and whether any steps have been taken to remove that objection? (Laughter.)

The Chancellor of the Exchequer: I have not heard of any such statement. The worst of it is, I am afraid those of us who are tired do not soon enough realise it. (Laughter.)



Another View of the "Constantinople" Handley Page Biplane on its arrival in Rome.

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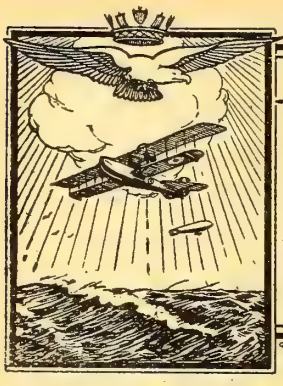
"Their actual time in the air was about nine hours as far as Rome, and if the machine had been carrying mails, only the two Pilots would have been needed, and they could have carried a couple of tons of mails."

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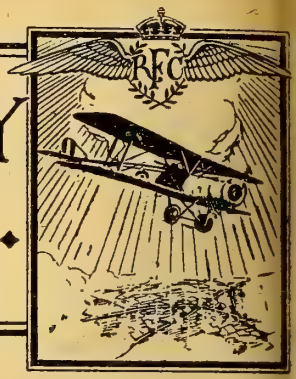
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NAVAL and MILITARY AERONAUTICS



FROM THE "LONDON GAZETTE."

Admiralty, Nov. 14th.

R.N.A.S.—Prob. Flt.-Comdr. to be Flt.-Comdr. :—E. B. Maycock, Oct. 17th.

War Office, Nov. 19th.

Correction.—The following is the correct description of :—Lt. L. M. Barlow, M.C., R.F.C., Spec. Res. (M.C. gazetted Aug. 25th.) (1st Bar gazetted, Oct. 18th.) (2nd Bar gazetted, Oct. 27th.)

* * *

The King has been pleased to approve of the award of the Military Medal for bravery in the Field to the following Non-Commissioned Officers and Men :—

44750 Sec. Cl. A. M. A. Cohen, R.F.C., attd. R.G.A. (Hounsditch, E.C.).
78140 Sjt. A. F. Fraser, R.F.C. (Gravesend).
8601 1st Cl. A. Mech. H. J. Lee, R.F.C., attd. R.G.A. (Wandsworth, S.W.).
10220 1st Cl. A. Mech. W. E. Lister, R.F.C., attd. R.G.A. (Blackpool).
P/13911 Cpl. J. Mason, R.F.C. (Everton).
23232 Sjt. A. A. L. C. Moir, R.F.C. (Kenley).
43972 Sec. Cl. A. Mech. W. V. D. St reet, R.F.C., attd. R.F.A. (Eastbourne).
65385 1st Cl. A. Mech. H. Watson, R.F.C. (Thornton).

* * *

The King has been pleased to approve of the award of the Meritorious Service Medal to the following Man for gallantry in the performance of military duty :—

69380 Sec. Cl. A. Mech. A. H. Norris, R.F.C. (Wood Green).

War Office, Nov. 20th.

REGULAR FORCES—Establishments—R.F.C.—Mil. Wing.—Flt. Comdrs.—From Flying Officers :—Capt. E. A. Fawcus, North'd Fus., T.F., Sept. 9th. And to be temp. Capts. whilst so empld. :—Sec. Lt. (temp. Lt.) E. H. Bryant, Essex R., T.F., Nov. 4th. Lt. G. E. G. Duff, Cam'n Highrs., Nov. 7th.

Asst. Instr. in Gunnery.—Graded as an Equipment Officer, 2nd Cl.—Lt. M. A. H. Fell, N. Zealand Inf., Nov. 1st.

War Office, Nov. 21st.

REGULAR FORCES—Establishments—R.F.C.—Mil. Wing.—Group Instr. in Gunnery.—Graded as a Flt. Comdr.—Temp. Capt. S. E. Adams, Gen. List, a Flt. Comdr., Oct. 25th.

Asst. Instr. in Gunnery.—Graded as an Equipment Officer, 2nd Cl.—Lt. D. R. Smith, Canadian Local Forces, from an Asst. Instr. in Gunnery (graded as an Equipment Officer, 3rd Cl.), Oct. 29th.

Adjt.—Capt. E. W. Forbes, M.C., R. War. R., T.F., Sept. 2nd.

Equipment Officers, 1st Cl.—From the 2nd Cl., and to be temp. Capts. whilst so empld. :—Sec. Lt. (temp. Lt.) C. H. Drabble, Spec. Res., Oct. 5th. Lt. G. W. Dobson, Hrs., Nov. 1st. Sec. Lt. (temp. Lt.) A. P. Sargeant, Spec. Res., Nov. 5th.

War Office, Nov. 22nd.

REGULAR FORCES—Establishments—R.F.C.—Mil. Wing.—Flt. Comdrs.—From Flying Officers, and to be temp. Capts. whilst so empld. :—Sec. Lt. (temp. Lt.) H. Brokensha, R.E., T.F., Nov. 6th. Temp. Sec. Lt. A. N. Kingwill, Gen. List, Nov. 10th. The appointment of Lt. (now Capt.) W. R. Read, M.C., D. Gds., notified in the "Gazette" of Sept. 26th, is ante-dated to Feb. 8th, 1915, but without pay or allowances prior to Sept. 5th.

Adjts.—Temp. Sec. Lt. (on prob.) J. D. H. Osborn, Gen. List, to be confirmed in his rank and to be temp. Capt. (without the pay or allowances of that rank) whilst so empld., Nov. 2nd. Capt. H. F. Copeman, Essex R., T.F., Nov. 4th.

Special Appt.—(Graded as a Park Comdr.)—Lt. (temp. Capt.) R. Holloway, Spec. Res., from an Equipment Officer, 1st Cl., and to be temp. Maj. whilst so empld., Nov. 6th.

Equipment Officer, 1st Cl.—Temp. Lt H. J. Lister, Gen. List (Lt. S. Afr. Defence Force), from the 2nd Cl., and to be temp. Capt. whilst so empld., Nov. 3rd.

Schools of Instn.—School of Technical Training.—Equipment Officer, 1st Cl.—And to be temp Capt. whilst so empld. :—Temp. Lt. A. MacKay, Gen. List, from an Equipment Officer, 2nd Cl., School of Technical Training, Oct. 13th.

War Office, Nov. 23rd.

REGULAR FORCES—Establishments—R.F.C.—Mil. Wing.—Wing Comdr.—Sec. Lt. (temp. Maj.) R. G. Blomfield, D. Gds., from a Sqdn. Comdr., and to be temp. Lt.-Col. whilst so empld., Oct. 30th.

Sqdn. Comdr.—Temp. Capt. R. Raymond-Barker, M.C., Gen. List, from a Flt. Comdr., and to be temp. Maj. whilst so empld., Sept. 17th.

Flt. Comdr.—Capt. G. I. Paterson, Canadian Local Forces, from a Flying Officer, Nov. 10th.

Instrs. in Gunnery.—(Graded as Equipment Officers, 1st Cl.).—From Asst. Instrs. in Gunnery (graded as Equipment Officers, 2nd Cl.), and to be temp Capts. whilst so empld., Nov. 2nd :—Sec. Lt. (temp. Lt.) J. L. L. Duffus, Gord. Highrs., T.F. ; temp. Lt. T. O. C. Pease, Gen. List.

Asst. Instr. in Gunnery.—(Graded as an Equipment Officer, 2nd Cl.)—Temp. Sec. Lt. N. Penty, Gen. List, from an Asst. Instr. in Gunnery (graded as an Equipment Officer, 3rd Cl.), and to be temp. Lt. while so empld., Nov. 2nd.

Equipment Officers, 1st Cl.—The rank of Lt. (temp. Capt.) R. Holloway, Spec. Res., is as now described, and not as in the "Gazette" of October 31st.

Schools of Instn.—School of Mil. Aeronautics.—Instrs. (graded as Equipment Officers, 1st Cl.) and to be temp. Capts. whilst so empld. :—Temp. Lt. J. H. Crutch, Gen. List, an Equipment Officer, 2nd Cl. ; temp. Lt. A. D. Bateman, Gen. List, from an Asst. Instr. (graded as an Equipment Officer, 2nd Cl.), School of Mil. Aeronautics, Sept. 4th. Lt. (temp. Capt.) G. G. Hubbard, Spec. Res., from an Instr. (graded as a Flt. Comdr.), School of Mil. Aeronautics, Sept. 5th. Temp. Capt. H. W. Wall, M.C., Gen. List, a Flying Officer (Observer), Sept. 8th.

Asst. Instrs. (graded as Equipment Officers, 2nd Cl.).—Lt. J. E. D. Samuel, Midd'x R., T.F., and to be secd., Sept. 3rd. Capt. R. C. Gill, R.A., a Flying Officer, temp. Lt. R. N. K. Jones, M.C., Gen. List, a Flying Officer (Observer), Sec. Lt. (temp. Lt.) L. B. Jones, M.C., Welsh R., T.F., a Flying Officer (Observer), Sec. Lt. (temp. Lt.) L. B. Goodyer, R. W. Surr. R., T.F., a Flying Officer (Observer), Sec. Lt. (temp. Lt.) T. S. Pearson, M.C., R.A., a Flying Officer (Observer), Sept. 8th. Temp. Sec. Lt. L. Howe, Gen. List, an Equipment Officer, 3rd Cl., and to be temp. Lt. whilst so empld., Sept. 12th. Sec. Lt. (temp. Capt.) F. R. Hardie, Hrs., a Flt. Comdr., Sept. 24th.

Gen. List.—Sjt. Clarence Mead Hallett to be temp. Sec. Lt., Aug. 8th, 1917.

War Office, Nov. 24th.

REGULAR FORCES—Establishments—R.F.C.—Mil. Wing.—Inspr. of Training, Training Div.—Bt. Maj. (temp. Brig.-Gen.) E. R. Ludlow-Hewitt, M.C., R. Ir. Rif., a Brig.-Comdr., and to retain his temp. rank whilst so empld., Nov. 7th.

Memorandum.—Lt. (temp. Maj.) A. C. Maund, Canadian Local Forces, a Sqdn. Comdr., R.F.C., to be temp. Lt.-Col. whilst specially empld., Oct. 23rd, 1917.

War Office, Nov. 26th.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing.—Flt. Comdrs.—Lt. C. R. Richardson, E. York. R., from a Flying Officer, and to be temp. Capt. whilst so empld., Oct. 22nd (substituted for the notification in the "Gazette" of Nov. 7th). From Flying Officers, and to be temp. Capts. whilst so empld. :—Temp. Lt. W. H. Peirce, Gen. List, Nov. 7th. Sec. Lt. R. V. James, Durh. L.I., T.F., Nov. 12th.

Special Appts.—(Graded as a Flt. Comdr. whilst holding the appt.).—The appt. of Lt. (temp. Capt.) E. G. Landon, Spec. Res., notified in the "Gazette" of Sept. 27th, is cancelled. (Graded as a Flt. Comdr.).—Temp. Lt. E. R. M. Griffin, Gen. List, as a Flying Officer, and to be temp. Capt. whilst so empld., Oct. 24th.

Inspecting Officer of Depots.—(Graded as Depot Comdr.).—Ormr. and Hon. Capt. (temp. Lt.-Col.) F. H. Kirby, V.C., R.F.C., from a Depot Comdr., and to retain his temp. rank whilst so empld. Aug, 31st.

(*Continued on page* 1608.)



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The Limit Gauge System in Aeroplane Work.

A Brief Illustrated Review of Gauge Forms and Functions.

By V. P. BENEDICT.

In repetition production of aero components to fine degrees of accuracy, the application of uniform standards by means of a close schedule of limits entails the necessity for some very accurate and reliable, withal extremely simple, method of controlling and defining measurements not only in the completely machined state, but also during the various manufacturing operations.

Under stress of present conditions, which demand intensive production by workers of comparatively short experience and, consequently, to some extent deficient in skill, success without some such efficient and fool-proof safeguard would be an utter impossibility.

In these circumstances, control of dimensions in the workshop by means of adjustable measuring instruments, with their complete dependance on personal equation and, from their extreme fineness, liability to wear and damage, would be hopelessly inadequate, apart from the expenditure of time in instructing all operatives in their use.

To meet this demand for keen accuracy from insufficiently skilled labour, great call has been made on the system known as limit gauges.

Limit gauges are fixed measuring devices accurately dimensioned in pairs, one to the highest and the other to the lowest limit in size which, in the work to be produced, would be permitted to pass as satisfacory.

The system must be capable of application to varied shapes and sections, hence the gauges themselves take many different forms. The underlying principles throughout remain, and, therefore, in a brief review of the more generally useful forms, a fairly comprehensive idea of the essential features can be embodied.

Accuracy—First, Second and Third.

Though entailing reiteration emphasis needs again be laid on the outstanding points which are the very foundation of successful working with limit gauges.

Accuracy—Initial and Maintained.

Every gauge must be accurate in dimension to a degree far keener than that of the productions it is to be used in checking, and this accuracy achieved must also be maintained. This will necessitate proving at regular intervals, having due regard to the amount of use and to the carefulness or lack thereof displayed in handling. Obviously, gauges in workshop use are subject to all kinds of rough treatment, intentional or otherwise. Usually gauges are hardened to guard both against wear and damage from unkind treatment.

Reliability and Fool-Proof Simplicity.

In designing and making gauges—quite apart from accuracy in the gauge itself—the construction and form must be such that accuracy of results in use shall not depend on any but average commonsense handling. They must permit of definite and reliable verdicts being obtained without calling into request any particular intellectual effort on the part of the operative, and so far as possible must be capable of application so as to be independent of and proof against all disturbing factors liable to produce false readings.

These are objects, which, while readily achieved in the case of gauges for plain diameters and lengths, become more complicated when profile, radius, depth and length gauges for pieces containing several elements are in contemplation.

The Cost Factor.

The expense of accurate limit gauges is, of course, a considerable item, particularly when handling fairly large dimensions, and although in the case of production running into big quantities, the percentage be relatively low, the dead expense involved, when it is necessary to make guages for small numbers, demands that the cheapest form of reliable check be adopted. Therefore will be found illustrated several alternative designs, notably in the case of rings and plugs, as against flat plate guages, for checking holes and outside diameters.

Working and Inspection Gauges

The factor of relation between gauge cost and production quantity will also to some extent govern the question of separate gauges for operatives and viewing inspectors' use.

This duplication is desirable if cost permits, in which connection note that practice varies, inasmuch as some establishments, instead of providing working and inspection gauges identical in dimensions, give the operative a gauge fixing limits slightly finer than actually permissible, while providing the view-room with one allowing the full tolerance. The object, of course, to lessen the percentage of rejections.

Working with Gauges.

The method of using gauges in the workshop will naturally vary in different productive operations. Thus, while in the case of consistent accuracy depending on the skill and care of the operator, as in centre-lathe work, the gauge must be applied to every individual piece as produced. Where the machine is automatic or semi-automatic, and can be set up to reproduce accurately the desired dimension without regard to other than ordinary care on the operator's part, a gauge will only need to be applied periodically, to ensure that tools have not worn, displaced, or from other cause failed to perform their functions properly.

Such operations as punching, drilling, reaming or broaching holes should only need very occasional measuring, and screwing by taps and dies only sufficiently often to catch any tool wear as soon as it starts to take effect. Likewise work which is performed with jigs or similar holding and positioning devices will not need individual gauging if reasonable care is exercised.

The work of gauging, like fire insurance, should always be on the over-thorough side. The cost in time is infinitesimal compared with the saving effected in the prevention of waste, and particularly does this apply to final operations where scrap means the loss of labour previously put on.

Gauge Design and Manufacture.

Space forbids even a brief excursion into the realms of a subject worthy of a better pen and a bigger inkpot than this present occasion commands, and far too technical and specialised to be covered—even in elementary review—within the compass provided by the complete pages of this issue unencumbered by editorial and other advertising matter which unfortunately appears to be very essential to its weekly existence. (I do hope Mr. Printer won't put "weakly.")

And so it must content, if, in addition to the already stated and reiterated demand for accuracy and for simplicity, it is here laid down that the construction must be strong to produce rigidity sufficient to prevent spring or distortion, and withal must not be more cumbersome than absolutely necessary, since heaviness detracts from that facility in control which is requisite to obtain correct results. A too weighty gauge is apt to control the operator instead of the obviously essential reverse.

However, it is the hope that, in indicating by illustration the

form taken by what may be called the common or garden varieties, sufficient groundwork is provided to cover all average requirements, since the field of readers to which articles such as this appeal is restricted by the exclusion of any but those who have not at their disposal high technical knowledge or specialised assistance. Confessedly are these pages devoted to the assistance of the new comers into, and the lesser fry of, the numerous branches of the now vast and many-sided world of industry aeronautical.

LIMIT GAUGES FOR CHECKING INTERNAL DIMENSIONS.

Small holes, gaps, slots and similar are usually proved with plug gauges of the form shown in sketches A and B. These each consist of two plain round plugs, mounted on a handle, ground and polished after hardening, the one to the highest and the other to the lowest permissible dimension. The handle portion is knurled to provide grip, and should be engraved with sufficient particulars to ensure identification.

The "go" or minimum limit end is to enter with reasonable freedom, the hole being checked, otherwise this is too small. Likewise the "not go," or maximum limit, portion should not enter. If it does the hole is over-size to an extent demanding rejection.

This "not go" portion of the gauge is generally made shorter in length than the "go" end; firstly, to provide instant recognition of which is which, and secondly because, since it is only to enter over-size holes, it is—or anyway it should be—subject to the lesser amount of wear.

FIGURES A AND B.

Gauge A, with the plugs at either end of the handle, is the most universal form for general purposes, while Gauge B has the great advantage of bringing both limits into use at one handling, and also, since the "go" portion acts as a pilot or guide to ensure that the "not go" portion approaches the hole quite straight and true, it is sure to give truer readings in the hands of the inexperienced or the over-tired. This form, however, is subject to the limitation that its use is only possible where the hole is either deep itself or is open-ended and clear of obstruction to permit the extra length of gauge to pass right through.

In the large sizes, plug gauges like these, to ensure ease of handling, are made singly, the high and low limit as separate gauges each provided with a handle. Since absolute controllability is essential, weight needs to kept down to the lowest reasonable limit. To accomplish this various means are available, such as recessing the gauge out to cup shape or drilling a number of holes straight through from face to face. In extreme sizes it is necessary to form the actual gauging portion of a plain steel ring mounted on an aluminium centre carrying the handle. Which method—being, as well, economical in the amount of tool steel used—is particularly recommendable.

FIGURE C.

Here is a form of gauge for getting at diameters deep down in lengthy openings. It may be formed with two, three or four pegs, which project—equally spaced—from the central hub fixed to the long handle. The stem forming the handle should be centred at both ends, and it is essential that the pegs be ground on the points, after fixing, to a correct radius. This form of gauge is not simple to use on fine limits, since control owing to the handle length is less free. Correct readings are affected by even a slight tilt, so care must be taken to keep the handle truly co-axial with the hole being checked. Separate gauges for high and low limits are necessary.

FIGURE D.

D is a form of a gauge for internal measurements or for checking lengths and distances between projections. Fairly cheap to produce since it consists of a rod ground at the ends to dead length required, and to a radius usually slightly less than half its length.

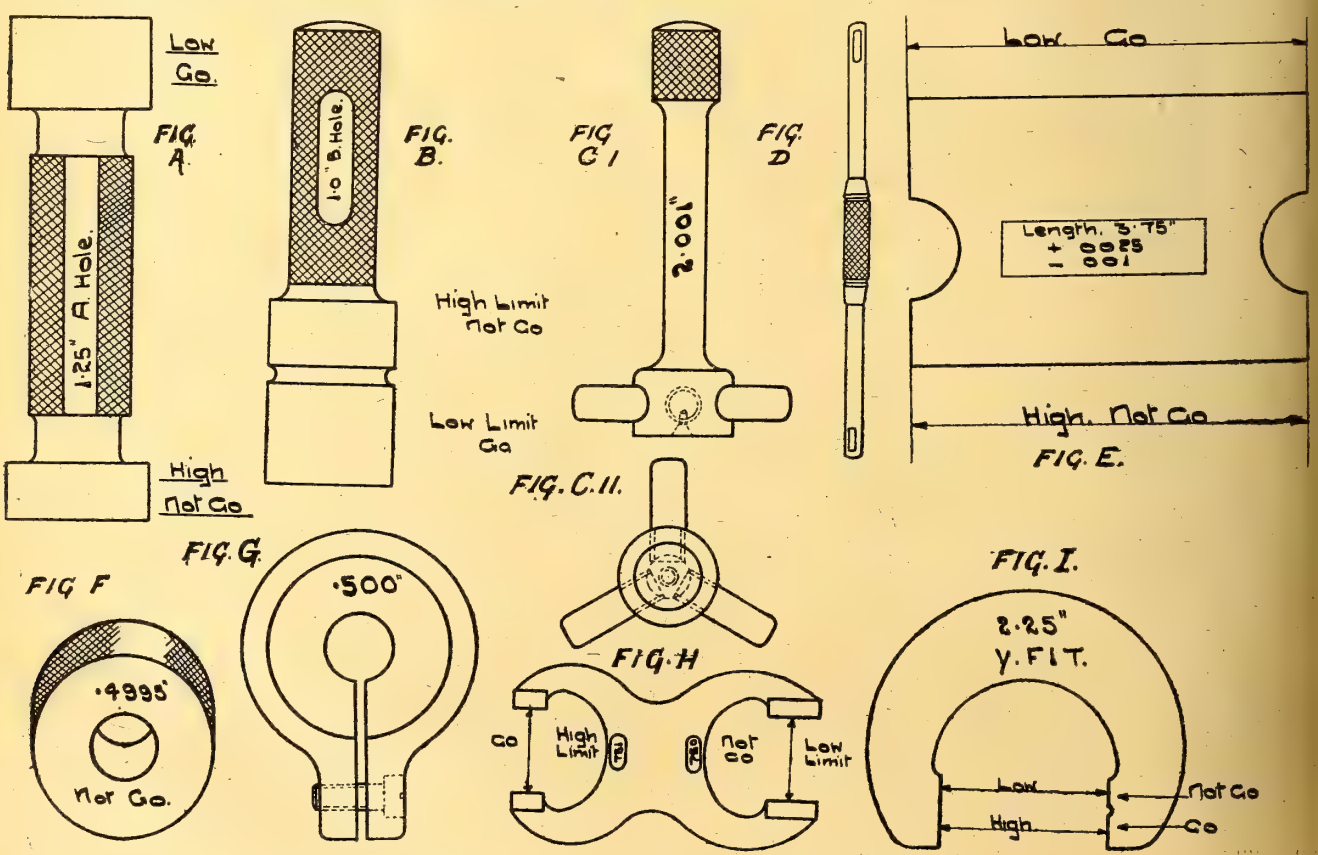
One dimension only is so provided, and when working to limits two are required, or expense can be saved by making the rod gauge the minimum or low limit dimension, and providing a feeler or thickness gauge, which is a thin strip of flexible steel accurately ground to a thickness equalling the total tolerance allowed. The object of which is to "feel" the extent of the gap, if any exists, when the rod gauge is inserted and to reject if gap is sufficient fully to admit the feeler.

To cite an example—for a Class B hole of 6 inches diameter, the rod would be made 5.999 inches which is the low limit, and the feeler used would be .003 inches covering the allotted tolerance and giving the maximum size of 6.002 inches. In acceptable holes the rod gauge itself is to pass freely but without sufficient gap to admit the feeler.

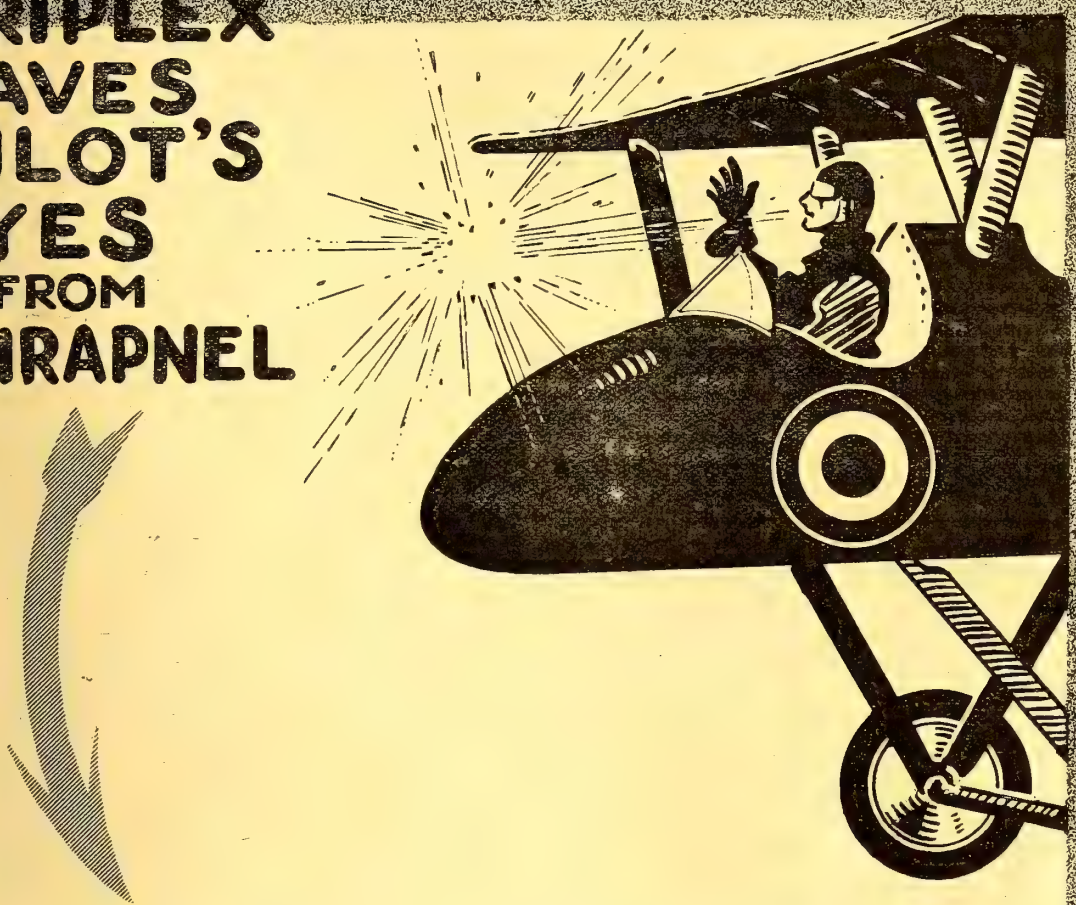
While not so satisfactory as the double plug gauge this method with reasonable care will serve quite well on small quantity production, even with fairly close limits, and it is particularly economical, since a second thickness of feeler provides a means of checking a similar nominal-sized hole with different tolerance.

FIGURE E.

In the plate gauge here sketched (E) one has probably the cheapest form of limit gauge for checking internal dimensions, consisting simply of a plate of flat steel, finished to high and low limit sizes on opposite edges. The working edges should be ground to a radius slightly less than that of the hole to be checked.



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Where the shape of the part to be gauged permits, it is good practice to have the high and low limits combined at one side, on the same lines as the single-ended limit plug gauge sketch B, with the same objects and subject to like limitations.

FOR CHECKING EXTERNAL DIAMETERS, THICKNESSES, AND LENGTHS.

FIGURE F.

F is a ring or cylinder gauge, the exact counterpart to the plug gauges A and B, consisting of a circular disc with hole accurately bored and ground to size through the centre. Edges are knurled to provide grip.

Plain round shafts—particularly if called for to fine limits—are usually checked by this form of gauge. Separate rings are required for high and low limits, or a ring may be used to the high limit, which has to pass over the shaft, and a plate gauge or caliper gauge (see sketches H, I, and J) for the low-limit check. There is considerable weight of opinion among experienced munitions inspectors that such a caliper gauge is preferable to a ring gauge for the low limit, chiefly for the reason that the slightest roughness (accidental, of course) will prevent the "not go" ring passing over what may be otherwise an under-size diameter, while the caliper gauge can be applied in several places to provide a sure check.

For high and low limit ring gauges in the smaller sizes there is of course no objection—other than the increased difficulty of holding to machine—to having the two holes side by side on one piece of metal. It is, however, a practice very seldom met with.

FIGURE G.

Here is shown a similar ring gauge to F, but which is designed to be usefully economical for protracted use, being slotted through and held firm by an outer band with ears projecting, fitted with set screw for locking-up purposes. A construction which permits of periodically closing up slightly and regrinding to true dimensions after wear.

In section this gauge needs to be fairly massive to check any tendency to spring when in use.

FIGURES H AND I.

CALIPER OR HORSESHOE LIMIT GAUGES.

In the double-ended form shown at H and the combined single-ended style as I are the most hackneyed of external gauging designs.

For protracted hard use the form H, which is a drop-stamping of heavy section girder type, is most satisfactory, and the same construction can of course be applied to the form of gauge I with both limits at one end.

Style I as drawn shows a plate or sheet-metal gauge and will be perfectly satisfactory if sufficient strength of material is provided to overcome any tendency to spring open should undue pressure be applied when using it.

FIGURE J.

A very useful design of caliper gauge this, in which the necessary gaps are formed between adjustable studs, either screwed into the frame and locked with a nut, or made a tight, sliding fit and fixed with a set pin or similar means.

Fairly high in initial cost but ultimately good economy, since capable, not only of periodical correction by adjustment of the studs, but also of variation in the setting, by which it can be made on occasion to cover a different pair of limits, within a small range.

FIGURES K AND L.

Snap gauges for lengths and thicknesses are here illustrated, the form being a plain plate with either the two limits separately or combined in the one gap. The strength of plate may be less than for diameter gauges since the opening need be only comparatively shallow, with correspondingly reduced liability to spring.

FIGURE M.

It will frequently be found possible to embody the gauges for several dimensions of a given component on one plate in the way here shown. This example would be for a flanged bush or a tappet or valve guide, and covers two different diameters of barrel, A, B, diameter of flange C, and thickness also thereof D, with a limit gauge E for the length over all.

Economy is effected in the material and the marking, while some advantage accrues by keeping the whole set together, which saves time in handling. On the other hand, the use is restricted to one operative or viewer, which limitation should be borne in mind lest the desire for initial economy carries the idea to unworkable extremes.

SOME FREQUENTLY USED MISCELLANEOUS LIMIT GAUGES.

The following examples illustrate the forms taken by a few gauges for component dimensions rather less simple than the plain lengths and diameters so far reviewed. It is in such as the following that the limitations imposed by lack of space severely handicap any endeavour to cover in detailed manner even a modest portion of the extensive field offered. So far as our illustrated examples of gauges for plain dimensions go, the subject has been pretty fully handled, since the forms are quite plain and all much of a muchness.

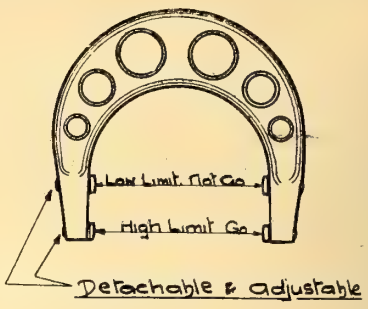


FIG. J.

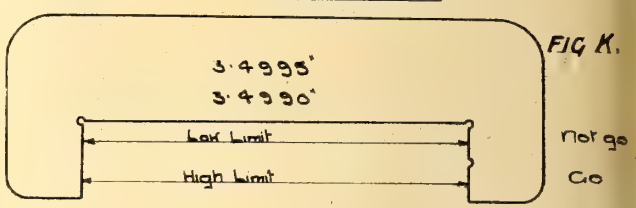


FIG K.

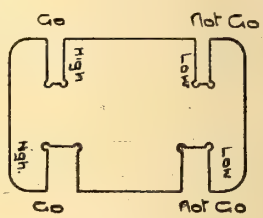


FIG. L

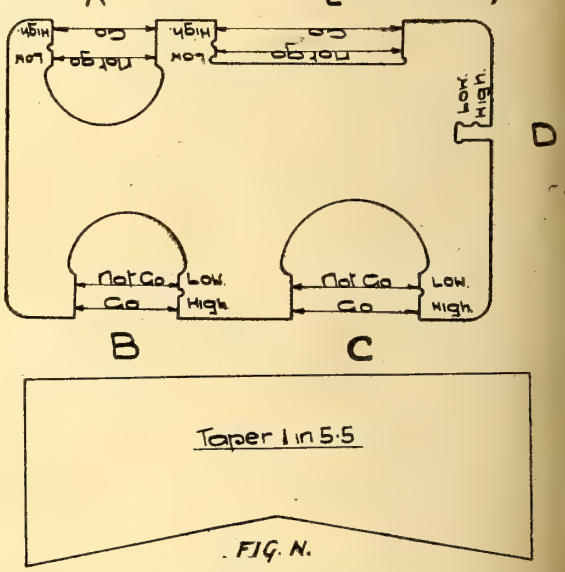


FIG. M.

FIG. N.

It is obvious, so many and varied are the different outlines and sections of the thousand and one pieces and components likely to be called for, that every one such will be a law unto itself in the matter of appropriate gauge design, and no more can be done here than to illustrate one or two general examples to serve as suggestions to cover the most commonly met cases.

CHECKING TAPERED OUTLINES.

Taper holes and shafts, such as occur in sprockets, gear wheels, or propeller hubs, would be gauged with suitably tapered plugs and rings in exactly similar form to those given for plain round diameters in examples A for plugs and F for rings. With the difference that an indication is given either by a line marked on the gauge or by the length of the gauging portion to show just how far the job should permit of insertion if correctly made. Sometimes it is necessary to cut away about a fifth of the gauge in the form of a slot or gap to permit visual examination to ascertain that the whole length of the faces is in contact. Such a case would occur in checking the tapers on pipe unions and nipples where a leak-proof joint is required.

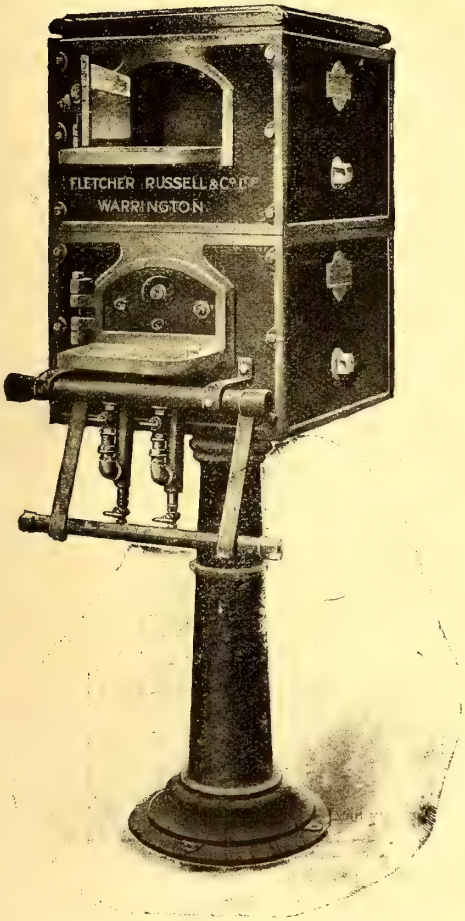
FIGURE N.

A raised taper face could be checked with a sunk taper plate gauge of this form (N), in which error would be recognised by

4

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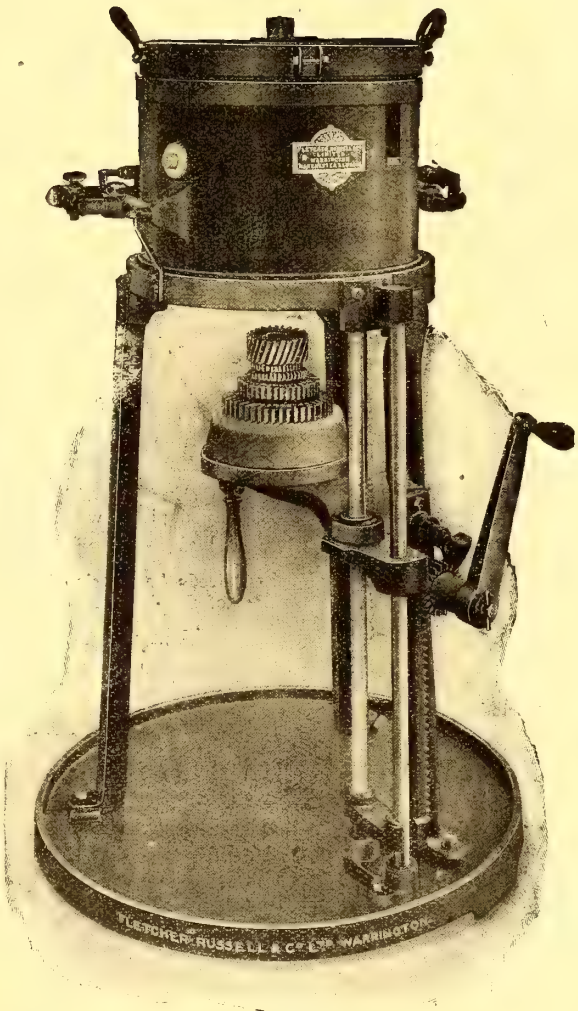


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any occurring gap when the gauge was laid squarely against the surface to be measured. Where the component is circular and tapered the gauge would need the measuring edges ground off to a sharp or knife edge, and would also need to be laid truly across the centre line to get accurate verdicts. The extent of the error occurring can, if necessary, be measured by the use of feelers or thickness gauges inserted between the two faces at the point where the gap is greatest.

The same style of gauge will serve for almost any form of similar outline such as radiused sections or cambered sections.

FIGURE O.

This is a gauge combining several elements—width of recess, depth between faces, and the angle of the inner face, also diameter of a secondary small recess or opening in the centre of this latter. Incidentally, the concentricity of the different diameters is proved. In this particular example the important dimension is that of depth between faces, so that a high and low limit is provided to keep this within the tolerance allowed. If importance applies to the small and large diameters, these would have to be covered by separate gauges, and the outline gauge sketched would need these two elements a little undersize to permit insertion, and so formed would serve simply to check depth, taper, and concentricity.

GAUGES FOR GETTING ROUND PROJECTIONS AND CORNERS.

FIGURE P.

It often happens that in designing gauges for plain lengths it becomes necessary to get from one to the other face over interlying projections, and also frequent is the case where two faces though parallel are in different planes. Such would be covered by a gauge cut away or stepped in the form shown at P. This sample is a fairly simple plain one, adopted to show the basic method which is applicable to such instances.

FIGURE Q.

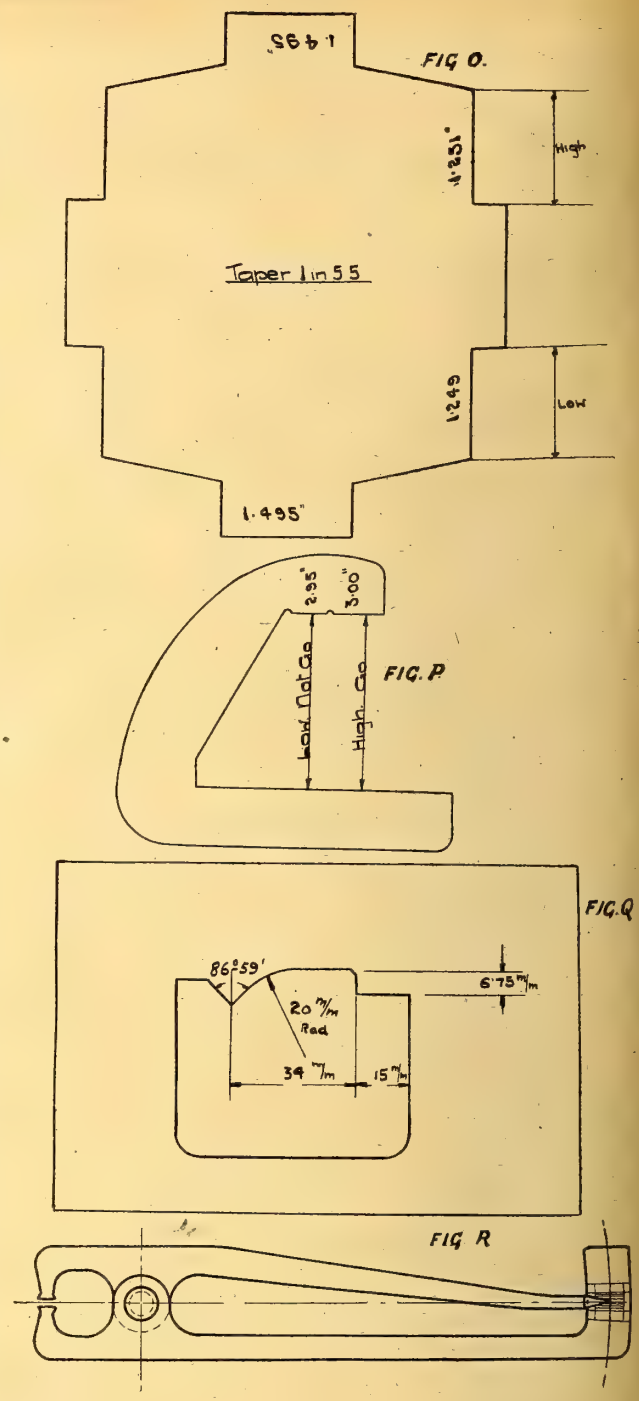
For figured outlines the checking gauge must take the same form as the outline, as shown by the drawn figure, scaled to exact dimensions. Gauge illustrated at Q is an example.

FIGURE R.

More in the nature of an opening caliper than a limit gauge, our final example, Figure R, is a device for measuring the depth of a keyway or slot—or, more correctly, the thickness of metal remaining when the slot has been cut. The same idea is used for gauging the thickness of wall left after machining cylinders or pistons, and can be made to permit measurements being taken in between radiating fins or similar projections. Its use is possible for a wide range of purposes, where more ordinary forms of gauge are incapable of application.

The lines marked, indicate from the position of the pointer whether the thickness of material between the gauging points is within or without the permissible limits. The gauge is not so intricate or difficult to make as may appear at first glance. The limit marks are set out by inserting between the gauge ends a slip of metal cut to the requisite thickness for each dimension and lightly clamped while the lines are marked out. The chief demand for care is in the formation of the hinged pivot, which must be made without shake or play, but is no more difficult than the joint of an ordinary opening caliper.

Whereat, since verbosity, like components, needs be restricted within acceptable limits, must be set the line of finality, subject all the same to the hope—or threat if as such some may regard it—that an occasion will arise in the very near future whereon may be penned, even if never printed, some condensed remarks on the methods—good, bad, and indifferent—by which the limit gauges here described are applied.



AN IMPORTANT ITALIAN AIRCRAFT CONCERN.

The famous engineering and shipbuilding concern, the Societa Gio Ansaldo of Genoa, is now making aircraft upon a very large scale. This firm, which is comparable in this country only with Vicker's, Armstrong's, or Beardmore's, or in Germany with Krupps', is governed by the brothers Pio and Mario Perrone. These enterprising men, both of whom are but slightly past forty years of age, have shown enterprise in every department of engineering, and it is not surprising, therefore, that their aeronautical products are equally original and successful.

The Ansaldo firm has incorporated the S.I.T. (Societa Italiana Transaerea, Turin) business, which holds the Bleriot and Voisin licences for Italy, and the F.I.A.T. Saint-Georges business for the manufacture of aero-engines. In addition an important aircraft works has been established at Borzoli, near Genoa, the whole establishment being raised upon green fields within eight months.

An aerodrome site was purchased about six miles from the works, the surrounding terrain being unsuited to this purpose. A number of houses were pulled down to clear the ground, and a first-class testing depot established.

Owing to the difficulty of procuring steel tube suitable for aircraft work, the firm laid down tube mills to work to make its own. And as first-class wing fabric was scarce, they installed a silk-weaving plant to make special fabric for themselves.

They then commenced to build S.V.A. (Sit-Verduzio-Ansaldo) aeroplanes, successful examples being single-seater land machines and seaplanes, whose most noteworthy feature is the use of triangularly arranged tubular interplane struts, much after the practice prevailing before the war in certain German biplanes and in the French Clement-Bayard biplane, the object in view being the elimination of unnecessary bracing cables.

On a land machine of this description the military aviator Stoppani flew from Turin to Rome in 2 hr. 50 min. This machine is regarded as a long-distance fighter, and can carry fuel for eight hours, in the course of which it will fly between 1,600 and 1,700 kilometres, which represents the distance from Rome to Paris. When some of the fuel carrying capacity is utilised for bomb loads the machine becomes a formidable raiding unit. The seaplane is a similar machine fitted with long, narrow twin floats of Howard Wright type.

Some idea of the extent of the activities of the Perrone Bros. may be judged from the fact that they employ over 60,000 workmen in their various factories, an important proportion of whom are engaged upon aircraft construction.

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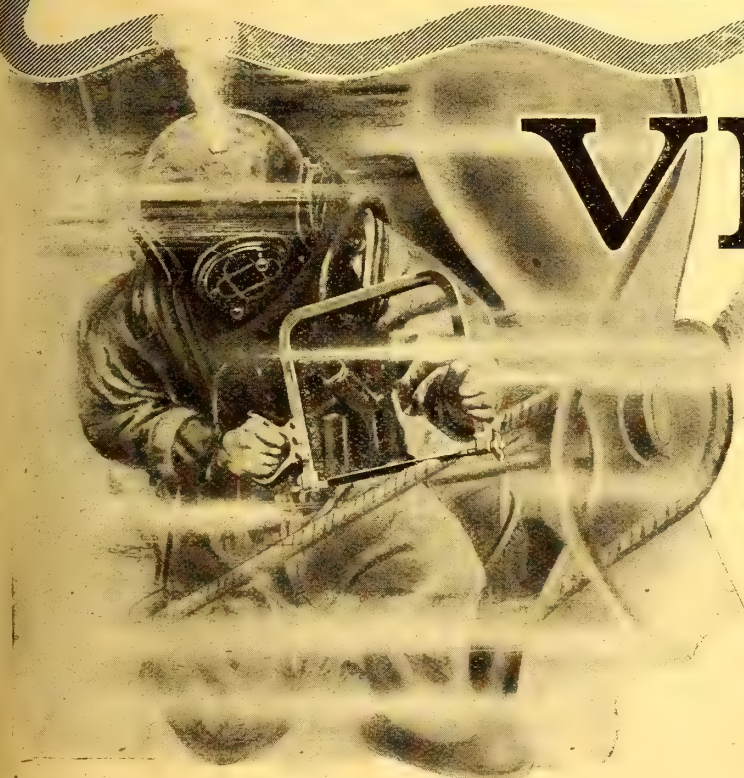


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Now that so many aeroplane manufacturers are building new works or extending existing ones, the question of motive power is of prime interest.

The advantages which the electric-drive offers as regards efficiency of transmission, flexibility of application, and general convenience are well known and universally admitted, and its adoption may almost be taken for granted. The electric motor lends itself so readily to the drive of individual machines, rows of machines, or hand-tools, the system can be so readily extended when required, lighting by electricity is, in any case, so essential, that there is really no alternative for the modern works engineer to consider.

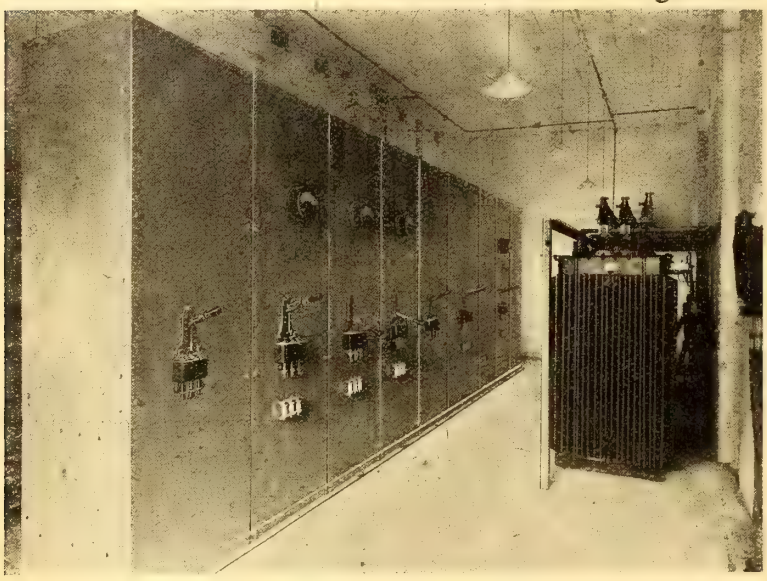


Fig. 1.—Static Transformer Station.

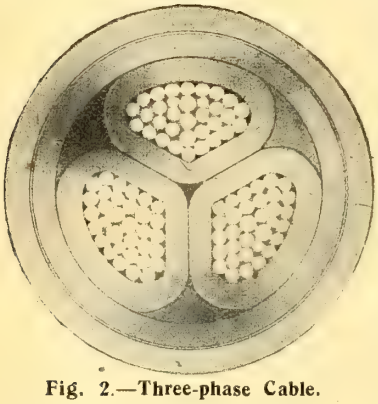


Fig. 2.—Three-phase Cable.

The method of obtaining the current, however, varies considerably, according to local conditions. Where there is a satisfactory district service within reasonable distance, it will, of course, be found most economical to obtain the supply therefrom. It is usually transmitted in the form of high-tension alternating current, as this permits of economy in the cost of the mains. The necessary feeder-cable is laid from the generating station, or district sub-station, to a sub-station at the works, where the incoming high-tension supply is transformed down to the working pressure, usually 440 volts.

This is effected by means of static transformers, and the interior of such a sub-station is shown in Fig. 1. There is, of course, no moving machinery in the sub-station, and no permanent attendant is required, the responsibility for the sub-station being usually assumed by the electricity supply company.

Fig. 2 shows the section of an extra high-tension 3-phase power cable, paper-insulated and lead-covered, to be laid in earthenware ducts. Such a cable can also be supplied armoured with steel wire or tape, for laying direct in the ground—this method being cheaper, if the soil is suitable.

Current is also often supplied, in the less populous districts, by overhead transmission lines. Such a line is shown in Fig. 3.

The underground cable is always to be preferred, owing to its greater safety, reliability, freedom from interruption by accidental or malicious damage, etc. In a well-designed and erected overhead line, however, the chances of accident and interruption are reduced to a minimum, and the capital cost of such a line is a good deal lower than that of an equivalent underground line. The choice must be determined by local and individual conditions.

Figs. 4 and 5 are examples of works generating installations, where no outside power supply was available, and current had to be generated on the spot. The former is a comparatively small plant, the generator being driven by an oil-engine. The latter shows a considerably larger power-station, a vertical suction-gas engine with complete producer plant being the source of power.

The illustrations given above have been supplied by Johnson and Phillips, Ltd., of Charlton, London, S.E.7, and are only examples taken almost at random of many installations carried out by them, with electrical equipment manufactured throughout by themselves, to meet varying conditions of service. They will be pleased to place their experience at the disposal of firms contemplating increasing their productive capacity.

NOTES FOR YOUNG DESIGNERS.

The following notes pertaining to the design and assembly of aeroplane and seaplane fittings, and component details of construction, have been set down with a view to improving the knowledge of those who will be responsible for the manufacture of new aircraft in the future.

WELDED JOINTS.—It is most essential that all joints, whether plate or tubular, should not have any of the welding matter therein cleaned up with a file or other implement.

After the welding process has been completed the fitting or component should be annealed. This only applies to small details of construction. Large built-up portions of framework constructed of tubing should not be annealed.

TUBES.—Tubes which are required to take high stresses should not be welded.

It is very desirable that clips and like attachments should

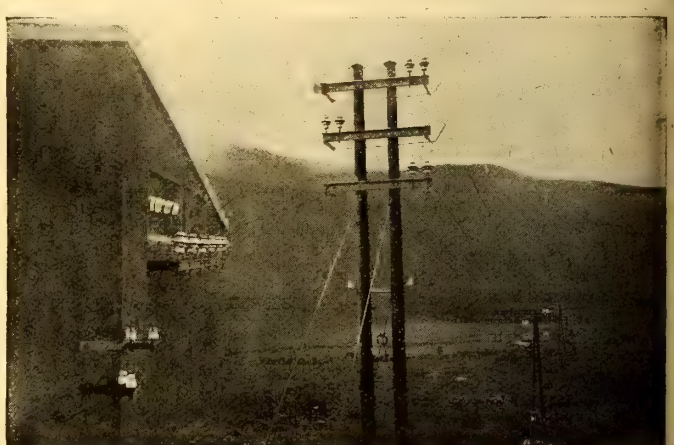


Fig. 3.—Over-head High-tension Main Line.

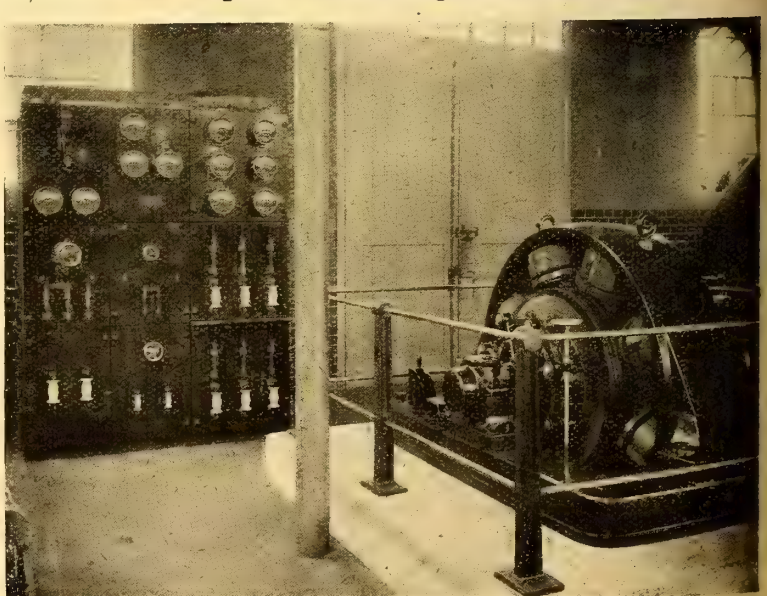


Fig. 4.—Small Power Plant, driven by Oil Engine.

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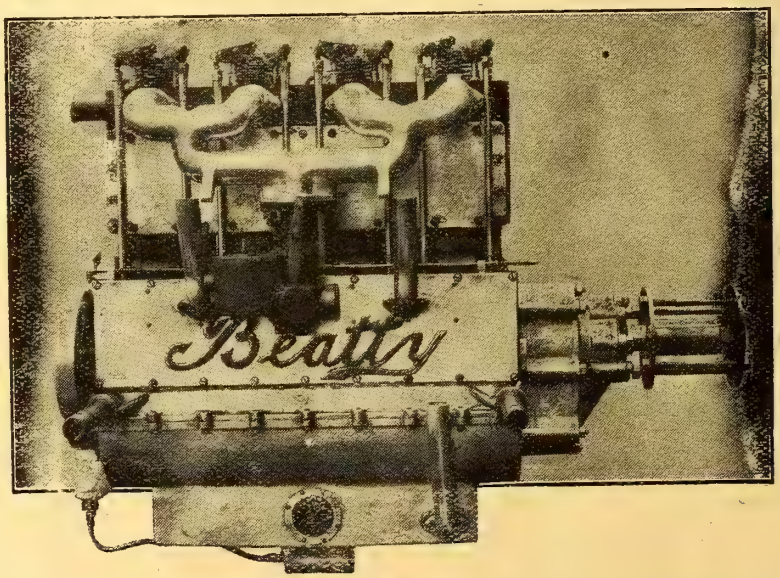
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Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1176.
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Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes." Cowes 193.
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Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston." Kingston 744.
Standard Aircraft Manufacturing Co., Effingham House, Arundel Street, W.C.2. "Gunsignrush, Estrand, London." City 80.
Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickerfyta, Knights, London." Kensington 6810.
Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 120.
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Airships—

Airships, Ltd., High Street, Merton. Wimbledon 1314
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Bearings (Etonia Cast Phosphor Bronze)—

Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3927.

Brass Sheets for Tipping Propellers—

Lucraft, H., & Co., 147, Fenchurch Street, London, E.C.3. "Lucraftia, London." Avenue 2217.
Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London" Avenue 995, 996, and 7006.

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Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
The Wilfley Co., Ltd., Salisbury House, London Wall, E.C.2. "Wrathless, Phone, London." City 2681-2

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Central Aircraft Co., Palmerston Works, High Rd., Kilburn, N.W.6. Hampstead, 4728.
The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aercracons, Canning, London." East 1300.
The Osborne Aircraft Co., Ltd., Whin Hill, Greenock, Scotland. "Cordage, Greenock." Greenock 618.

Cords, Tapes, and Threads—

MacLennan, J., & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.

Dopes—

British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312.
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Mann, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston road, London." Museum 70.
Premier Electric Heaters, Ltd., 258, 259, and 360, Bradford Street, Birmingham. "Fahrenheit, Birmingham." Midland 981.

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Engines and Parts—

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"Rolhead, London." Gerrard 1654
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London." Walthamstow

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City 7

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204, Tottenham Court Road, W.1. "Vi
mag, Phone London." Museum

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"Clifford, Birmingham." Central 42

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e Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.
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Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

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Rubber Tubing & Accessories—

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Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432.
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Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay, 345 (3 lines).
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The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.
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Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.
Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton." Southampton 1337.

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Seats for Aeroplanes—

Bowser, E., Art Cane Works, 50 Park Lane, Leeds. Central 3437.

Shackles—

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Sheet Metal Pressings—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.
W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk, Bham." Central 550.
British Metal (Kingston), Ltd., Kingston-on-Thames.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 407 Birmingham.
Nicholls & Lewis, Ltd., 16, Princep Street, Birmingham. "Colpressed, Birmingham." Central 7188.
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The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.

Shock Absorbers (Elastic Cord)—

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Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.

Sparking Plugs—

Forward Motor Co., Summer Row, Birmingham. Central 6259.
Hobson Manufacturing Co., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.
Lodge Sparking Plug Co., Ltd., Rugby. "Igniter, Rugby." Rugby 235.
Ripault, Leo, & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758.

Springs—

Dart Spring Co., West Bromwich. "Dart, West Bromwich." West Bromwich 322
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Steel—

Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237.
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Cradock, G , & Co., Ltd., Wakefield. "Cradock, Wakefield." Wakefield 466 (3 lines).

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Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

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MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.
James North Hardy & Son, Ltd., 54, Portland Street, Manchester "Hardson, Manchester." Central 6471.

Timber—

Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Entikosil, Vic, London." Victoria 5073, 4210.
Brown, R. F., & F. W., Wollaton Saw Mills, near Nottingham. "Brown's Saw Mills, Wollaton." Nottingham 1526.
J. Owen & Sons, Ltd., 199a, Borough High Street, S.E.1. "Bucheron, London."

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Clark, R. Ingham, & Co., Caxton House, S.W.1. "Pearline, Vic, London Victoria 2923
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Naylor Bros., Ltd., Southall, Middlesex "Naylor, Southall." Southall 30.

Washers—

Herbert Terry & Sons, Ltd. Redditch. "Springs, Redditch." Redditch 61.

Watchmakers and Jewellers (Silver Models)—

Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 0091 (3 lines).

Welding and Cutting Plant—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Welding Repairs—

Barimar, Ltd., 10, Poland Street, W.1. "Barimar, Reg, London" Gerrard 8173.
Imperial Light, Ltd , 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Wind Shields—

Auster, Ltd., 133, Long Acre, W.C. "Winflector, London." Regent 5910.
London Label Co., Ltd , Hadley Works, Beckton Road, E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1 "Shatterlys, Piccy, London." Regent 1340.

Wire Gauze—

N. Greening & Son, Ltd., 16, Finsbury Street, London, E.C. "Setscrew, Finsquare, London." London Wall 1082.

Wires and Cables (Aeroplanes)—

Bruntons, Musselburgh, Scotland. "Wiremill, Musselburgh." Musselburgh 28.
Cradock, Geo., & Co , Ltd., Wakefield. "Cradock, Wakefield." Wakefield 466 (3 lines).

Wirework—

Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Woodworking Machinery—

Robinson, Thomas, & Son, Ltd., Railway Works, Rochdale. "Robinson, Rochdale." Rochdale 467.
Sagar, J., & Co., Ltd., Halifax. "Sawtooth, Halifax." Halifax 136.
Wadkin & Co., Leicester. "Woodworker, Leicester." Leicester 2614.

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Acetylene Welding Plant—
Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, Phone, London." 3540 Victoria (3 lines).

Aeroplane Manufacturers—
Aircraft Manufacturing Co., Ltd., Hendon. "Airmanship, Hyde, London." Kingsbury 180.
Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne." Gosforth 500.
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.
British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol." Bristol 3906.
British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudroplan, Crickle, London." Hampstead 5551.
Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6. Hampstead 4403 and 4404.
Davidson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1144-1145
Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1176.
Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 120.
Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophid, Crickle, London." Hampstead 7420.
Mann, Egerton & Co., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
Martinsyde, Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge." Woking 331; Byfleet 171.
National Aircraft Co., Ltd., 15, Hackney Road, N.E.2. London Wall 6725.
"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London." Willesden 2455.
Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48.
The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis, London." Putney 2230-2231.
Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester." City 8530-8531, Manchester.
Sage, Frederick & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes." Cowes 193.
Short Bros., Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London." Regent 378.
Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston." Kingston 744.
Standard Aircraft Manufacturing Co., Effingham House, Arundel Street, W.C.2. "Gunsignrush, Estrand, London." City 80.
Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickerlets, Knights London." Kensington 6800.
Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.
White J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes." Cowes 3

Airships—
Airships, Ltd., High Street, Merton Wimbledon 1371
Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, Phone, London." Regent 378.

Aluminium Castings—
Coan, R. W., 219, Goswell Road, London, E.C.1 "Krankases, Isling, London." City 3846

Bearings (Etonia Cast Phosphor Bronze)—
Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3927.

Brass Sheets for Tipping Propellers—
Lucraft, H., & Co., 147, Fenchurch Street, London, E.C.3. "Lucraftia, London." Avenue 2217.
Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 995, 996, and 7006.

Buildings—
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation -Norwich." Norwich 851.
Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
The Wilfley Co., Ltd., Salisbury House, London Wall, E.C.2. "Wrathless, Phone, London." City 2681-2

Cable Coverings and Cable Controls—
Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Capstan Work—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Carburettors—
Hobson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.

Casein—
Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3. "Surie don, Fen London." Avenue 34 and 35.

Castings—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Lucraft, H., & Co., 147, Fenchurch Street, London, E.C.3. "Lucraftia, London." Avenue 2217.

Castings (Aluminium, Brass, Bronze, Machined or Rough)—
Coan, R. W., 219, Goswell Road, London, E.C.1. "Krankases, Isling, London." City 3846.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Celluloid (Non-Flam.)—
Greenbill & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7.
London Label Co., Beckton Road, E.16. "Lonlabel, Canning, London." East 1300.

Clothing—
Burberry's, Ltd., Haymarket, S.W.1. Regent 2165.
Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6.
Hazel & Co., 4, Princes Street, Hanover Square, W.1. Mayfair 4071-2.
Robinson & Cleaver, Ltd., Regent Street, London, W.1. Gerrard 1070.

Component Parts—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (4 lines).
B. D. V. Aircraft Spares, Syon Chambers, 161, Kew Road, Richmond, Surrey. "Aeros, Richmond." Richmond 1681.
Central Aircraft Co., Palmerston Works, High Rd., Kilburn, N.W.6. Hampstead, 4728.
The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aerocranes, Canning, London." East 1300.
The Osborne Aircraft Co., Ltd., Whin Hill, Greenock, Scotland. "Cordage, Greenock." Greenock 618.

Cords, Tapes, and Threads—
MacLennan, J., & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.

Dopes—
British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312.
British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellutate, London." Regent 4046.
Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Aswell, London." London Wall 5350-3622.
Clark, Robert, Ingham & Co., Ltd., Caxton House, S.W.1. "Pearline, Vic, London." Victoria 2023
Duxford Aviation Society, Duxford, Cambridge. "Duxford, Cambridge." Cambridge 642.
Short & Mason, Ltd., Macdonald Road, Walthamstow, E.17. "Aneroid, Phone, London." Walthamstow 180.

Electrical Accessories—
Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 1564.
Mann, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston road, London." Museum 70.
Premier Electric Heaters, Ltd., 258, 259, and 360, Bradford Street, Birmingham. "Fahrenheit, Birmingham." Midland 981.

Electric Cables—
E. Kalker & Co., Coventry. "Kalker, Coventry." Coventry 248.
Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 1564.

Electric Lighting and Power—
E. Stanley Fardon, A.M.I.E.E., 67, Mosley Street, Manchester.
Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 1564.

Engines and Parts—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford. "Pump, Bedford." Bedford No. 1.
Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.
The Beatty School of Flying, Ltd., The Broadway, Cricklewood, N.W.2. Hampstead 3000.
Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London." Gerrard 238.
Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London S.W.1. "Aeroflight, Vic, London." Vic 7026.
Gordon Watney & Co., Ltd., Weybridge. "Mercedes, Weybridge." Weybridge 550 (7 lines).
Green Engine Co., Ltd., Twickenham. Richmond 1203.

Engines and Parts (*continued*)—
Gwynnes, Ltd., Hammersmith Iron Works, Hammersmith, W. "Gwynne, Hammersmith." Hammersmith 1910.
Napier & Son, D., Ltd., 14, New Burlington St., London, W., and at Acton, W. "Natrifier, London." Gerrard 8926.
Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1. "Rolhead, London." Gerrard 1634-5-6.
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.
Sturtevant, B. F., Co., Ltd., Hyde Park, Boston, U.S.A.
Sunbeam Motor Car Co., Ltd., Wolverhampton. "Moorfield, Wolverhampton." Wolverhampton 985.
The Gnôme & Le Rhône Engine Co., Ltd., 47, Victoria Street, S.W. "Elevenfold, London." Walthamstow 408 (2 lines).

Flare Lights—
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, Phone, London." 3540 Victoria (3 lines).

Flexible Shafts—
Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Flying Schools—
Bournemouth Aviation Co., Ltd., Talbot Village, Bournemouth. "Etches, Winton." Bournemouth 1160.

Furniture (Office)—
Cooke's (Finsbury), Ltd., Finsbury Pavement House, London, E.C.2. London Wall 573 and 6179.

Galvanising—
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851
Cowper-Coles Manufacturing Co., Sunbury-on-Thames. Sunbury 37.

Gears—
Moss Gear Co., Ltd., Thomas Street, Aston, Birmingham. "Mosgear, Birmingham." East 407

Glue—
Improved Liquid Glues Co., Ltd., 61, Hermitage Street, E. (Croid.). "Excroiden, Wapp, London." Avenue 3178.
Mendine Co., 8, Arthur Street, E.C. Bank 5873

Goggles—
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Heating and Ventilating—
Chas. P. Kinnell & Co., Ltd., 65 & 65a Southwark Street, London, S.E.1. "Kinnell, London." Hop 372 (2 lines).

Instruments—
British Wright Co., Ltd., 33, Chancery Lane, W.C.2. Holborn 1308.

Instruments (Scientific, Altimeters, etc.)—
The Cambridge Scientific Instrument Co., Ltd., Cambridge "Instrument, Cambridge." Cambridge 642.
Short & Mason, Ltd., Macdonald Road, Walthamstow, E.17. "Aneroid, Phone, Walthamstow 180.

Machine Tools—
Brewster & Co., 11, Queen Victoria Street, E.C.4. "Circumfuse, Cannon, London." City 768.

Magneto Driving Pieces—
Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Magnetos—
The M-L Magneto Syndicate, Ltd., Victoria Works, Coventry. "Carlton, Coventry." Coventry 1008-1009.
The British Lighting & Ignition Co., Ltd., 204, Tottenham Court Road, W.1. "Vickmag, Phone, London." Museum 430.

Metal Manufacturers—
Clifford, Chas., & Sons, Ltd., Birmingham. "Clifford, Birmingham." Central 4243.

Metals in General—
Samuel Mercer & Co., 198, Upper Thames Street, E.C.4. "Reconciled Cannon, London." City 6142.
Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 995, 996, and 7006.

Metal Parts and Fittings—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
Aircraft Supplies Co., Ltd., Ascot House, 125, Long Acre, W.C.2. "Upcast, Rand, London." Gerrard 376 (2 lines)
Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.
Arnott & Harrison, Ltd., Hythe Road, Willesden Junction. "Willesden 2207.
Bayliss, Jones & Bayliss, Ltd., Wolverhampton. (Bolts and Nuts.) "Bayliss, Wolverhampton." Wolverhampton 1041
The Birmingham Guild, Ltd., 45, Gt. Charles Street, Birmingham. "Handicraft." Central 3705
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
The British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow, London. "Golshel, Hounslow." Hounslow 254

Metal Parts and Fittings (*contd.*)—
British Metal (Kingston), Ltd., Kingston-on-Thames.
Mann, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston road, London." Museum 70.
Mountford, Fredk., Ltd., Fremo Works, Lifford, Birmingham "Fremo, Birmingham." Kings Norton 261.
Rubery, Owen & Co., Ltd., Darlaston. "Roofs, Darlaston." Darlaston 87.
Sankey, Joseph, & Sons, Ltd., Wellington, Shropshire. "Sankey, Wellington, Salop." Wellington 66.
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.
The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aerocranes, Canning, London." East 1300.
Thompson Bros., Ltd., Bradley, Bilston. "Thompson Bros., Bilston." Bilston 10.
Wooter Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10.

Metal Shearing Tools—
Montgomery, Smith, & Co., Ltd., Tangent Works, Keynsham, near Bristol. "Ingenuity, Saltford." Keynsham 21.

Metal Spinnings—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Metric Bolts—
Cashmore Bros., Zota Works, Hildreth Street, Balham, S.W. Battersea 415.
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

Miscellaneous—
Anderson, D., & Son, Ltd. (Roofs), Belfast. "Anderson, Belfast." Belfast 4033-4034-4035.
Anti-Glare Glass Co., Ltd., 76, Turnmill Street, E.C. Central 3731.
Bowden Wire, Ltd., Willesden Junction, "Bowirelin, Harles, London." Willesden 2400 (3 lines).
British Metal (Kingston), Ltd., Kingston-on-Thames.
Brown Bros., Ltd., Great Eastern Street, E.C.1. "Imbrowned, Bethrood, London." London Wall 6700.
Endolithic Manufacturing Co., Ltd., 613, Fore Street, London, E.C.2. Labels in Metal, Ivory, Ivorine, etc.
Herbert Frood Co., Ltd., Chapel-en-le-Frith. "Frodobrake, Birmingham." Central 793.
Glasso Manufacturing Co., Ltd., 211, City Road, E.C. City 9558.
London Label Co., Ltd., Harley Works, Beckton Road E.16. "Noniflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.
MacLennan, J., & Co., 30, Newgate Street, E.C.1., and at Glasgow. Tapes, Cords and Threads. City 3115.

Motor Cars—
Arrol Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.
Mann, Egerton & Co., Ltd., 370/380, Euston Road, London, N.W.1. "Manegecar, Euston road, London." Museum 70.
Standard Motor Car Co., Coventry. "Flywheel, Coventry." Coventry 530 (4 lines).

Nameplates and Labels—
British Metal (Kingston), Ltd., Kingston-on-Thames
Endolithic Manufacturing Co., Ltd., 613, Fore Street, London, E.C.2.
The Clegg Metal Engraving Co., Chatsworth Works, Worthing. "Clegg Worthing."

Observation Panels—
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Parachutes—
E. R. Calthrop's Aerial Patents, Ltd., Eldon Street House, Eldon Street, London, E.C. "Savemalivo, Ave, London." London Wall 3266-3267.

Patent Agents—
King's Patent Agency, 165, Queen Victoria Street, E.C.4. Central 682.
Page & Rowlingson, 27, Chancery Lane, E.C.4. Central 332.
Stanley Popplewell & Co., 38, Chancery Lane, W.C.2. Central 1763.

Pattern Making—
Fredk. Ward, 6, 7 and 8, Allsop Street, Upper Baker Street, W. Padd 4743.

Petrol Storage (Bulk)—
Bywater & Co. (The Hydraulic System), Craven House, Kingsway, London, W.C.2. "Bywaterist, London." Gerrard 2220.

Piston Rings—
British Chuck & Piston Ring Co., Coventry. "Rings, Coventry." Coventry 723.

Power Presses and Dies—
Bliss, E. W., & Co., 23, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon, London." Hop 4340.

Presswork—
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851
Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.
Integral Propeller Co., Ltd. "Aviprop, Hyde, London." Hendon 9; Kingsbury 104.
Lang Propeller, Ltd., Weybridge. "Aerosticks, Weybridge." Weybridge 520-521.
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 291, Leeds.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

Rigging for Aircraft—
Cradock, G., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466. Enfield 520 (6 lines).

Rubber Tubing & Accessories—
Hancock James Lyn, Ltd., 266, Goswell Rd., London, E.C.1. "Masticator, Isling, London." City 3811 and 3812.

Safety Belts—
Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.

Sand and Die Castings—
Coan, R. W., 219, Goswell Road, London, E.C. "Krankases, Isling, London." City 3846.

Scientific Instruments—
The Foster Instrument Co., Letchworth, Herts. "Instrument, Leeds." Chapeltown 474.

Seaplane Manufacturers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128.
Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.
Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton." Southampton 1337.

Searchlights and Landing Lights—
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, Phone, London." 3540 Victoria (3 lines).

Seats for Aeroplanes—
Bowser, E., Art Cane Works, 50 Fork Lane, Leeds. Central 3437.

Shackles—
The British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow. "Golshel, Hounslow." Hounslow 254.

Sheet Metal Pressings—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.
W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk, Bham." Central 550.
British Metal (Kingston), Ltd., Kingston-on-Thames.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 407 Birmingham.
Nicholls & Lewis, Ltd., 16, Princep Street, Birmingham. "Colpressed, Birmingham." Central 7188.
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).

Sheet Metal Work—
Thames.
British Metal (Kingston), Ltd., Kingston-on-Thames.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Rubery Owen & Co., Darlaston, South Staffs. "Roofs, Darlaston." Darlaston 87 (3 lines).
The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.

Shock Absorbers (Elastic Cord)—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Sage, Frederick, & Co., Ltd., Walton, Peterborough. "Sage, Peterborough." Peterborough 128

Sparking Plugs—
Forward Motor Co., Summer Row, Birmingham. Central 6259.
Hobson Manufacturing Co., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.
Lodge Sparking Plug Co., Ltd., Rugby. "Ignifer, Rugby." Rugby 235.
Ripault, Leo, & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758.

Springs—
Dart Spring Co., West Bromwich. "Dart, West Bromwich." West Bromwich 322
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Steel—
Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237.
Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham." Smithwick 224.

Steel Tension Wires—
Cradock, G., & Co., Ltd., Wakefield. "Cradock, Wakefield." Wakefield 466 (3 lines).

Steel Tubes for Aeroplanes—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Taper Pins—
Mountford, Fredk. (Birmingham), Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262

Tapes and Smallwares—
MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.
James North Hardy & Son, Ltd., 54, Portland Street, Manchester "Hardson, Manchester." Central 6471.

Timber—
Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Entikosil, Vic, London." Victoria 5073, 4210.
Brown, R. F., & F. W., Wollaton Saw Mills, near Nottingham. "Brown's Saw Mills, Wollaton." Nottingham 1526
J. Owen & Sons, Ltd., 1990, Borough High Street, S.E.1. "Bucheron, London."

Time Recorders— Hop 3811 (2 lines).
Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310

Turnbuckles—
Rubery Owen & Co., Darlaston, South Staffs "Roofs, Darlaston." Darlaston 87 (3 lines)

Tyres and Wheels—
The Palmer Tyre, Ltd., Shaftesbury Avenue "Tyricord, Westcent." Gerrard 1214 (4 lines)

Varnishes—
Clark, R. Ingham, & Co., Caxton House, S.W.1. "Pearline, Vic, London Victoria 2023
Harland, W., & Son, Merton, London, S.W.19 "Harland, Wimbledon 45." Wimbledon 45 and 1395
Naylor Bros., Ltd., Southall, Middlesex "Naylor, Southall." Southall 30.

Washers—
Herbert Terry & Sons, Ltd. Redditch. "Springs, Redditch." Redditch 61.

Watchmakers and Jewellers (Silver Models)—
Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 6000 (3 lines).

Welding and Cutting Plant—
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, Phone, London" 3540 Victoria (3 lines).

Welding Repairs—
Barimar, Ltd., 10, Poland Street, W.1. "Barlquamar, Reg, London" Gerrard 8173
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, Phone, London."

Wind Shields— 3540 Victoria (3 lines).
Auster, Ltd., 133, Long Acre, W.C. "Winflector, London." Regent 5910.
London Label Co., Ltd., Hadley Works, Beckton Road, E.16. "Noniflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Wire Gauze—
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Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

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Robinson, Thomas, & Son, Ltd., Railway Works, Rochdale. "Robinson, Rochdale." Rochdale 467.
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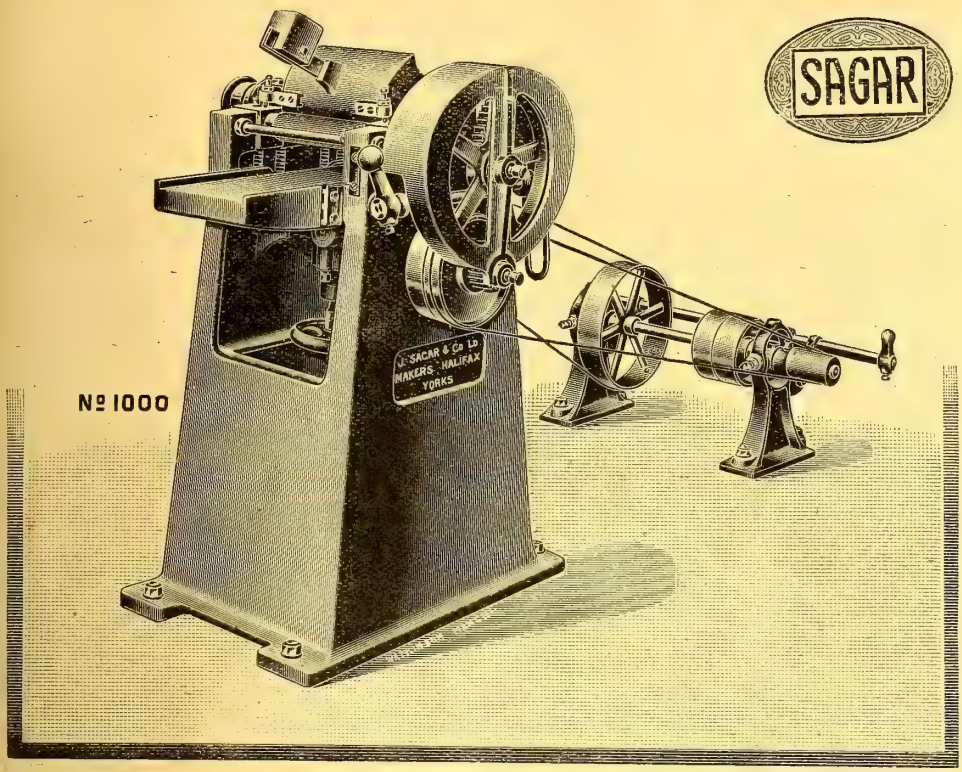
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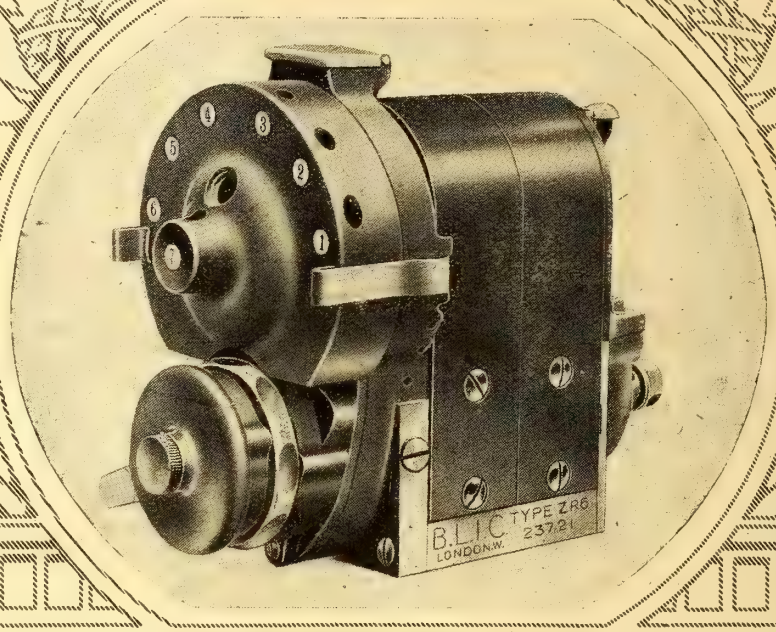
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AVOID WASTING DOPE

EVERY EFFORT MUST BE MADE to avoid waste of Dope and Dope Coverings. Waste can be avoided if the following points are watched carefully :-

1. Always keep all drums screwed up.
2. Never leave materials in the small containers when not in use and so allow the solvents to evaporate.
3. Do not completely fill a container when the job in hand only requires half that quantity.
4. Do not fill the brush when there is only a small portion of fabric to cover, or when doping near the edge of a plane. Drippings on the floor are a serious source of waste.
5. Dope is a thick liquid, so care must be taken to completely empty drums before returning them to us. Drums should always be turned upside down and allowed to drain.
6. Keep your brushes clean.
7. Check carefully the weight of deposit on fabric so as to get the increase called for in the Doping Schemes.

SEVERAL OF THE INGREDIENTS USED IN THE MANUFACTURE OF DOPE ARE ALSO NEEDED FOR OTHER WAR MATERIALS, THEREFORE WASTAGE IS UNPATRIOTIC.

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Copies of the above Poster for exhibition in Dope Shops can be obtained on application to the makers of

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THE PATENTS INDEX.

The subjoined list of recent inventions has been specially compiled by THE AEROPLANE from the current Official Patents Records.

PATENT APPLICATIONS.

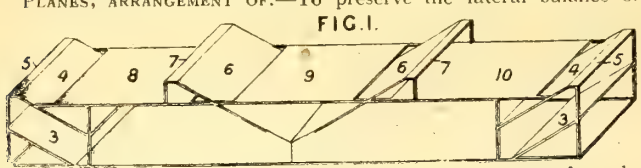
Arter, J. J. B. Machine, anti-aircraft, etc., guns. No. 16869. Nov. 16th.
Baker, W. E. Device for determining relative position to the vertical of a moving body. No. 16710. Nov. 14th.
Blackburn Aeroplane and Motor Co. Locking-devices for tension wires or stays of aircraft, etc. No. 16617. Nov. 13th.
Blackburn Aeroplane and Motor Co. Locking-devices for tension wires or stays of aircraft, etc. No. 16618. Nov. 13th.
Blackburn Aeroplane and Motor Co. Fuselages, boats, or floats of flying-machines, etc. No. 16798. Nov. 15th.
Boulton and Paul. Planes for aeroplanes. No. 16715. Nov. 14th.
Boxell, S. Propellers for aircraft. No. 16593. Nov. 12th.
Cassinelli, P. Inclination-registering apparatus with spirit level for aerial navigation. No. 16655. Nov. 13th.
Chaplin, P. F. Propellers for aircraft. No. 16825. Nov. 15th.
Cooke, J. A. Martin-. Hydro-aeroplanes. No. 16641. Nov. 13th.
Cowey, L. E. Course-indicators. No. 16669. Nov. 13th.
Ford, L. C. Girders. No. 16649. Nov. 13th.
Hammond, J. H. Dirigible devices. No. 16855. Nov. 15th.
Harding, W. F. S. Radiators for aircraft and vehicles. No. 16925. Nov. 16th.
Knight, J. Flexible driving mechanism for propellers of aircraft. No. 16688. Nov. 14th.
Lanchester, F. W. Gyro-compass for aircraft. No. 16724. Nov. 14th.
Lanchester, F. W. Vertical indicator for aircraft. No. 16725. Nov. 14th.
McClellan, J. H. Aeroplanes. No. 16661. Nov. 13th.
Mann, G. B. Bomb-discharging apparatus for aircraft. No. 16912. Nov. 16th.
Murray, J. J. Aeroplanes. No. 16845. Nov. 15th.
Murray, J. J. Aeroplanes. No. 16927. Nov. 16th.
R. Bourbeau et H. Devaux. Aeroplanes. No. 16910. Nov. 16th.
Timson, R. P. Aerial machines. No. 16715. Nov. 14th.

ABRIDGMENTS OF RECENTLY PUBLISHED SPECIFICATIONS.

109,636. Aeronautics. AHLBRECHT, A., 1, Chianti Street, Pittsburg, Pennsylvania, U.S.A.

PLANES, ARRANGEMENT OF.—To preserve the lateral balance of

FIG. 1.



aeroplanes, inclined superposed surfaces 3, 4 are arranged at the ends of the supporting-planes, and two inclined surfaces 6 are arranged, as shown, near the centre of the upper plane, above which the surfaces 4, 6 extend. The upper edges of the surfaces 6 are at a higher level than those of the surfaces 4 and both have horizontal deflectors 5, 7. The upper supporting-plane is divided into sections 8, 9, 10 with spaces to permit access of air currents to the surfaces 4, 6. The surfaces 3, 4 and 6 are inclined at approximately 30 degrees.

109,662. Internal-combustion engines. SEMMLER, C., 1, Schutzenstrasse, Wiesbaden, Germany.

CYLINDERS, COOLING.—The cylinder is maintained at a tempera-

FIG. 1.

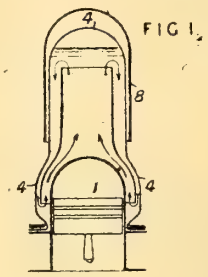
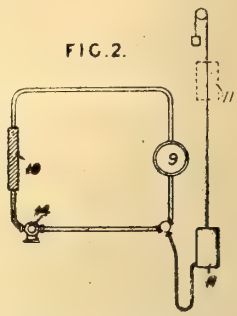


FIG. 2.

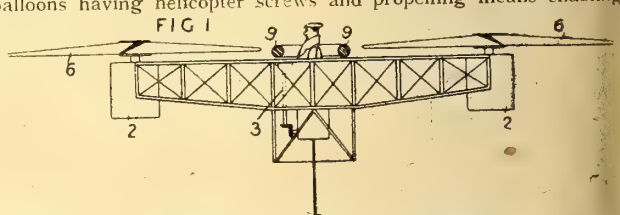


ture above 100 deg. C. by employing a liquid such as oil, glycerine, calcium chloride solution, fused naphthalene, or a fusible alloy, and keeping its temperature below its boiling-point. The liquid may be contained in a hopper 4 surrounding the cylinder 1 where it circulates by convexion and its temperature is regulated by a vertically adjustable air shield 8. Or, as shown in Fig. 2, it may be circulated through the cylinder jacket 9 and cooler 10 by a pump 14. The liquid may be withdrawn from the circulating system into a heat-storing vessel 11 and used to heat the cylinder on restarting the engine.

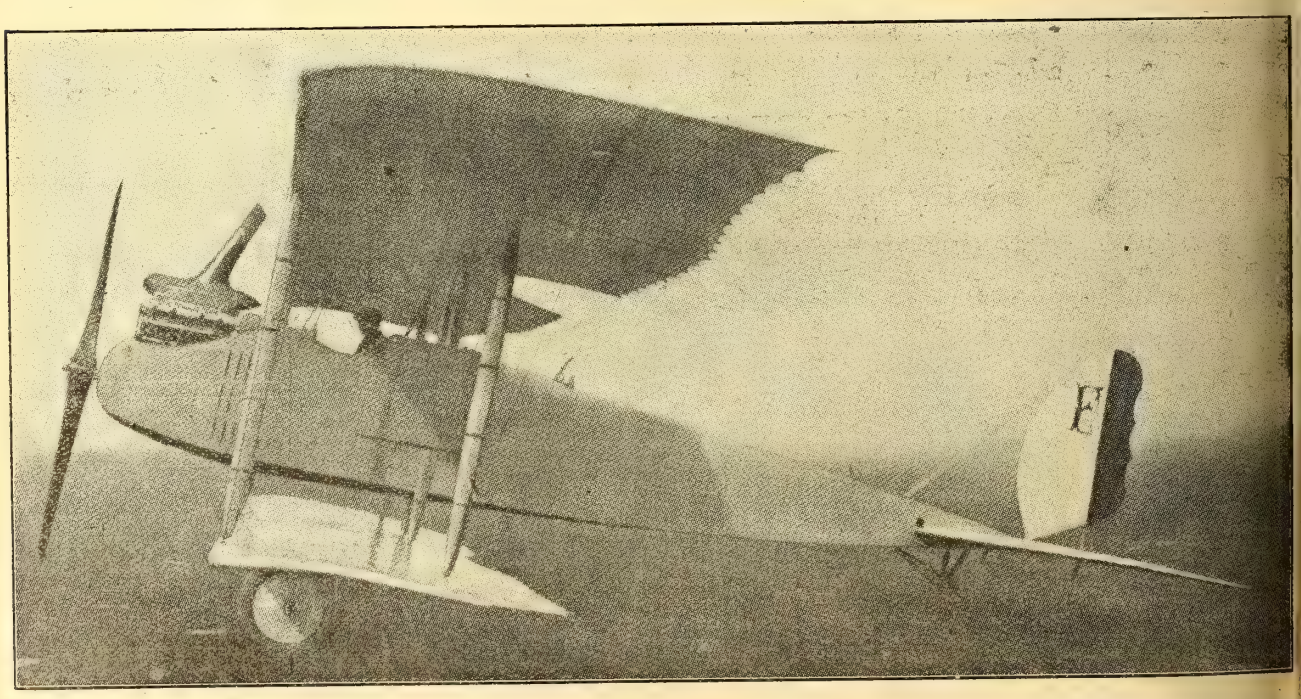
109,672. Aeronautics. PYBUS, P. J., and PHŒNIX DYNAMO MANUFACTURING CO., Thornbury Works, Bradford.

AERIAL MACHINES WITHOUT AEROSTATS; CAPTIVE BALLOONS; PROPELLING.—Observation machines of the helicopter type, or captive balloons having helicopter screws and propelling means enabling

FIG. 1



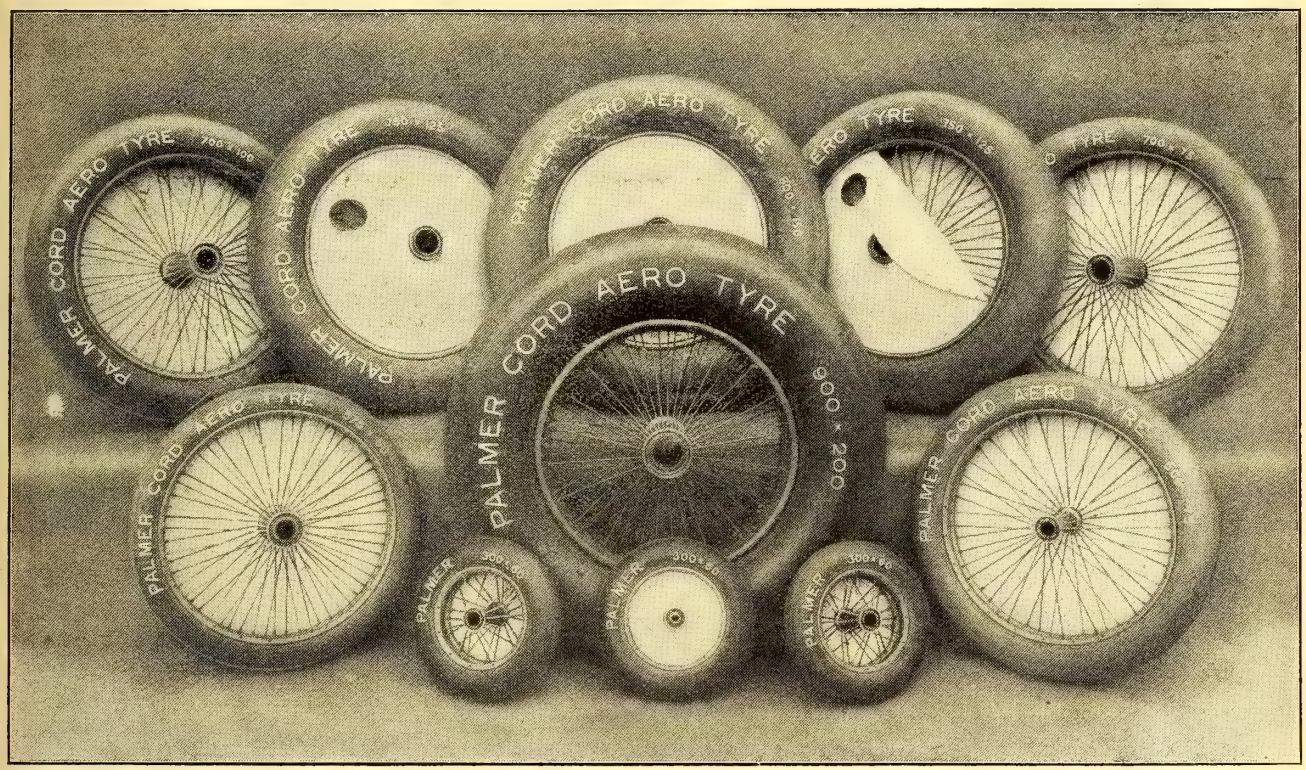
them to cruise within the limits allowed by the cable, are driven by direct-coupled high-voltage electromotors supplied through the connecting-cable from a source of energy on the ground or on board ship. Fig. 1 shows a helicopter having two screws 6 direct-coupled to induction motors 2 driven in opposite directions and controlled by a hand-wheel 3 acting on resistances. A parachute 9 is provided for the observer should the motors stop. Propelling-screws may be provided.



An Interesting Experimental Two-seater Fighter, built recently by Farman Frères, and known as the "Type F." This is one of the few Farman tractor machines, and the type has not been perpetuated.

PALMER

LANDING WHEELS & TYRES



STANDARD SIZES:

Tyre Sizes	Wheel No	Hub Length	Hub Bore	Track Line
		m m	m m	m/m
300×60	16	111.12	25.4	Central
,,	17	72.39	12.7	Central
450×60	30	89.	31.75	Central
575×60	111	150.	38.09	104/46
,,	21	160.	28.	Central
,,	34	150.	31.75	104/46
650×65	78	178.	44.45	132/46
,,	100	178.	38.09	132/46
,,	101	178.	31.75	132/46
600×75	111	150.	38.09	104/46
,,	21	160.	28.	Central
,,	34	150.	31.75	104/46
700×75	78	178.	44.45	132/46
,,	100	178.	38.09	132/46
,,	101	178.	31.75	132/46

Tyre Sizes	Wheel No.	Hub Length	Hub Bore	Track Line
		m m	m/m	m/m
700×75	*80	178.	44.45	132/46
,,	*91	178.	31.75	132/46
,,	*98	178.	44.45	Central
700×100	92	185.	55.	135/50
,,	95	185.	55.	Central
,,	77	178.	44.45	132/46
,,	93	150.	40.	Central
,,	33	150.	38.09	Central
,,	99	178.	38.89	132/46
,,	96	178.	55.	132/46
750×125	92	185.	55.	135/50
,,	95	185.	55.	Central
,,	77	178.	44.45	132/46
,,	93	150.	40.	Central
,,	33	150.	38.09	Central
,,	99	178.	38.89	132/46

Tyre Sizes	Wheel No	Hub Length	Hub Bore	Track Line
		m/m	m/m	m/m
750×125	96	178.	55.	132/46
800×150	82	185.	55.	135/50
,,	85	185.	55.	Central
,,	†36	185.	55.	135/50
,,	†40	185.	60.32	135/50
1000×150	97	250.	65.4	Central
,,	102	185.	55.	125/60
,,	201	185.	60.32	125/60
900×200	39	185.	55.	Central
,,	42	185.	60.32	125/60
,,	47	185.	55.	125/60
,,	202	185.	60.32	Central
1100×200	52	185.	55.	116/69
,,	57	185.	55.	Central
,,	203	185.	60 32	116/69
,,	204	185.	60.32	Central

**Wheels Nos. 80, 91 and 98 are fitted with a wider and stronger rim, and the 700 x 75 tyres when fitted to this rim caliper 83 m/m.*

†Wheels Nos. 36 and 40 are of stronger type than the other wheels for 800 x 150 tyres.

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THE AIRCRAFT TRADER

MARKET TOPICS.

COPPER.—The American authorities have not yet completed their scheme for distributing supplies, and although various reports have been received, it is as well to reserve any criticism until official information has been received.

Supplies are much more satisfactory and the refineries and mines are making gigantic efforts to increase the output. Stocks are still very low, and the position cannot be considered secure, due, of course, to the recent labour troubles which, by the way, were caused by agitators paid by German money. This was particularly the case with the strike at Butte Mines. Prices here continue unchanged and supplies are fairly good, plenty of metal apparently being available for national requirements.

Comparative Prices.

To-day	£110	0	0	per ton.
Highest Price, 1916	153	0	0	per ton.
Average Price, 1916	116	0	0	per ton.

TIN.—The outlook is still very uncertain, prices continuing very high. The position of this market has not been improved by the authorities here censoring all information from the East regarding shipments of Tin from there, with the natural result that buyers are very backward, not wishing to take risks blindly. The question of future supplies is having a very strong influence on the market, and the holding back of shipping information makes the whole position very obscure; on the other hand, the market is soon affected by any news of the possibility of the elimination of shipping dangers.

Since last week's report, the price has risen to £283, the lowest figure reached being £274 10s.

Comparative Prices.

November 20th	£279	10	0	
November 16th	276	15	0	
November 12th	269	0	0	
Last Month	249	0	0	
Last Year	188	0	0	

STEEL.—The question of supplies appears to be exercising the minds of the Air Board authorities, urgent instructions having been sent to all firms engaged on aircraft steels for every possible effort to be made to increase the output; it is also understood that steps have also been taken to increase the output of ferro-chrome. It will be remembered that in THE AEROPLANE of October 31st attention was directed to "the foolish policy of waiting until constructors, who are making tremendous exertions to considerably increase their outputs, are ready actually to place their orders: the time to get as many mills as possible on aircraft Steels is now" (i.e., a month ago). The officials are certainly making gigantic efforts to be ready. The Ministry of Munitions might do worse than put a "Cast-iron-inflexible" embargo on the production of Steel for luxury and peace-time purposes; every ounce of Steel will be required for war purposes and there still appears to be supplies of Steel for the purposes mentioned procurable.

The revision of prices is still uncertain, the Ministry of Munitions not having yet decided how to deal with the advance in the price of coke.

High Speed Steel is still very difficult to obtain and Cast Steel supplies show no improvement.

LEAD.—Supplies are now improving and it is a little easier to get orders for material required for war work executed. Prices remain unaltered.

TIMBER.—The attention of the authorities should be directed to the supplies of English Ash. It is at the present time difficult to obtain first-class, dry, well-seasoned Ash, and although supplies are better than Silver Spruce, no time should be lost in conserving the stocks and getting the wood in Stick.

In this connection the following question asked in the House of Commons on November 12th will be interesting:—

"**Mr. G. Terrell** asked the President of the Board of Agriculture whether difficulty is being experienced in securing adequate supplies of English Ash timber for aeronautical purposes, whether a certain league has been entrusted by the Air Board with the work of obtaining through voluntary workers particulars as to the number and position of suitable Ash trees throughout the country; and, if so, why the existing machinery of the Board of Agriculture is not being utilised for this purpose?

"**Sir Albert Stanley**: Special efforts are being made to increase supplies of home-grown timber, including Ash, and the Aerial League of the British Empire is rendering voluntary assistance in obtaining information, arrangements to this end having been made by the Controller of Aeronautical Supplies, with the concurrence of the Controller of Timber Supplies, in whom is now vested the machinery of the late Home-Grown Timber Committee of the Board of Agriculture."

Silver Spruce continues to be very scarce indeed, although a few small shipments have been received, but these are but a "drop in the ocean" compared with the consumption; furthermore, although substitutes have been approved, adequate supplies of the latter do not appear to be forthcoming.

Mahogany is still advancing in price and fairly good supplies are available; Walnut is, however, becoming a thing of the past. It is distressing to observe that the aeroplane industry is now threatened with an acute shortage of 3-ply, unless some drastic and energetic action is immediately taken.

FABRIC.—It is gratifying to note that the Irish labour troubles have now been settled, and the output of linen fabric is becoming more satisfactory. Prices still remain the same although it would not be surprising to see an advance early next year.

CURRENT MARKET PRICES.

Nov 22nd, 1917.

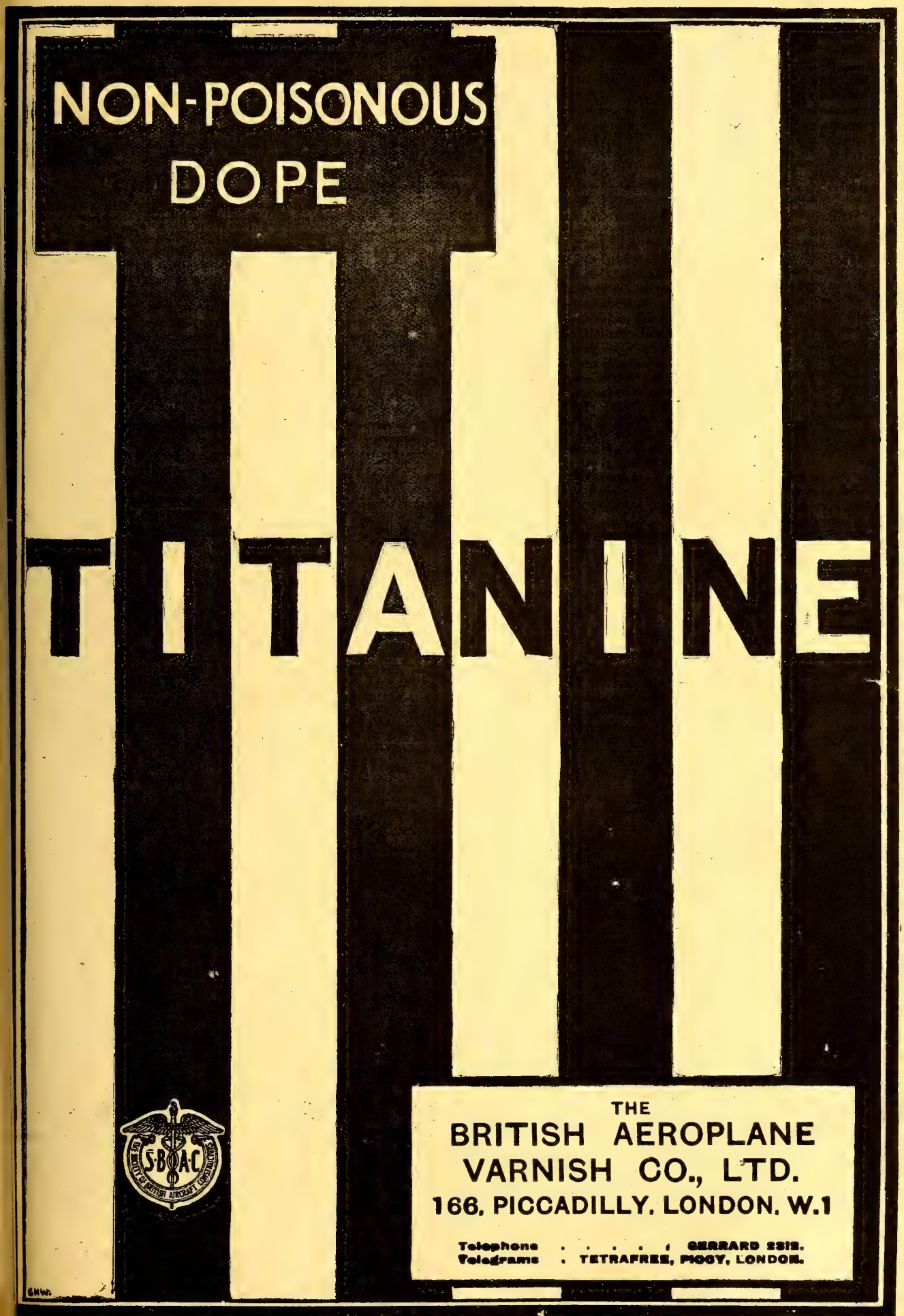
The prices given below are the prices ruling on the above date.

TERMS.—Usual for the various materials mentioned.

Prices of old metals are as quoted by scrap dealers.

Prices must not be taken as specific quotations for definite quantities delivered to any part of the country.

ALUMINIUM.*	
Ingot	£225 per ton.
Remelted	£210 per ton.
BRASS.	
Sheets	15⅝d. per lb.
Strip	14⅝d. per lb.
Wire	14½d. per lb.
Tubes	15½d. per lb.
Castings	15d. per lb.
Turning Rod	14d. per lb.
Brazed Tubes	19½d. per lb.
COPPER.	
Ingot, Standard, Cash	£110 per ton.*
Ingot, Standard, 3 mos.	£110 per ton.*
Best Selected (Nett)	£123 to £119 per ton.
Sheets	£150 per ton.
Wire	15½d. per lb.
Tubes, S.D.	18½d. per lb.
Tubes, Brazed	18½d. per lb.
Rivets	1s. 10½d. per lb., basis.
Tacks	1s. 10d. per lb.
FABRIC.*	
Linen, R.A.F., 17C, Spec., 36 in. wide,	2s. 8d. p. yd.
Linen, R.A.F., 17C, Spec., 38 in. wide,	2s. 9½d. p. yd.
Spaced, R.A.F., 17C, Spec., 37½ in. wide,	1s. 9d. p. yd.
GUN METAL.	
Castings	1s. 8d. per lb.
LEAD.*	
Virgin Pig	£29 per ton, c.i.f.
Virgin Pig	£30 per ton, ex stores.
Sheets	£39 10s. per ton, D/d.
Pipes	£40 per ton.
Dry White	£46 10s. per ton. less 5 per cent.
White in Oil	£53 per ton. (lots over 5 cwt. less 5 per. cent.)
White in Oil	£55 per ton. (lots under 5 cwt. less 5 per cent.)
Red	£42 per ton, less 2½ per cent.
NICKEL.*	
Nickel	£200 per ton.
PHOSPHOR BRONZE.	
Ingots, 5 cwt., and under	£150 to £170 per ton. (Subject to Copper and Tin Fluctuations.)
Castings	1s. 7d. to 1s. 9d. per lb.



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PHOSPHOR COPPER.

Ton lots .....£200 to £205 per ton.

SILVER.

Silver .....43½d. per oz.

SOLDER.

Plumber's .....118s.
Tinman's .....154s.

STEEL.*

High Speed, 14 p. cent., Tungsten, 2s. 10d. per lb., basis.
High Speed, 18 per cent., Tungsten, 3s. 10d. per lb., basis.

ALLOY STEELS TO AIR BOARD SPECIFICATIONS.‡

Round and Square :—

Specification No. S2	£86
Specification No. S2 (bright-drawn)	£115
Specification No. S8	£86
Specification No. S10	£70
Specification No. S12	£75
Specification No. S14	£43
Specification No. S15	£70
Specification No. S16	£70
Specification No. S17	£75
Specification No. S18 (oil-hardened)	£86
Specification No. K1	£75
Specification No. K2	£75
Specification No. K3	£86

The above prices are for ¼ in. to 5/16 in. only, other sizes are proportionate.

HEXAGONS.

	.455 and .525	.601 and .710
Specification S2	£79	£77
Specification S8	£79	£77
Specification S2 (bright-drawn),	£112	£112
Specification S8 (bright-drawn),	£112	£112

SPELTER.

English f.o.b., Birmingham £57

TIN.

Tin .....£276 15s.

TINPLATES.*

Tinplate .....30s., basis, f.o.t.

TIMBER.

	Official.	Merchants.
Silver Spruce,	10s. 4d.	18s. 6d. to 19s., c.f.
English Ash		16s., c.f.
Mahogany,	1s. 6d. to 1s. 10d.	2s. 4d. to 2s. 8d., s.f.
Walnut,	2s. to 2s. 3d.	2s. 4d. to 2s. 8d., s.f.

ZINC.

Zinc Sheets (American).....£110, f.o.b., New York.

SCRAP MATERIALS (LONDON PRICES).

ALUMINIUM.

Description.	Price per ton on sale to refiner, delivered at refinery.
Sheet cuttings and rods containing a minimum of 96 per cent. Al.	£160 0 0
Old rolled, etc., containing a minimum of 96 per cent. Al.	120 0 0
Spinnings, punchings, and thin small scrap; also painted and varnished scrap that needs melting, containing a minimum of 96 per cent. Al.	105 0 0
Lump scrap from aero castings and material of equivalent value, containing 87 to 95 per cent. Al.	100 0 0
Turnings and Swarf, generally containing 87 to 95 per cent. Al.	87 10 0
Scrap, generally containing 80 to 86 per cent. Al.	80 0 0
Swarf and inferior Swarf, generally containing 80—85 per cent. Al.	70 0 0
All Scrap, containing below 80 per cent. Al., not to exceed	65 0 0
All Swarf, containing below 80 per cent. Al., not to exceed	60 0 0
Brass, Heavy Selected	£88
Copper, Clean	100
Copper, Brazery	80
Gun Metal, Scrap	118
Lead, no Draft	26
Zinc, Old	40

*Official Prices.
†Includes Selection and Delivery.
‡Prices include Delivery in the U.K.



A SCHEME FOR SEAPLANE PILOTS.—The windproof, waterproof unsinkable flying-suit illustrated above has been experimented by the Davidson Aviation Co. in the hopes that it may appeal to seaplane pilots, or to pilots of land machines flying over the sea. The pilot whose machine lets him down in the sea is thus provided with an inflatable suit which he blows up according to his particular wishes as regards amount of flotation above the surface. He can either emerge considerably so as to attract attention or submerge to escape the notice of an enemy. In fact, he can perform very much like a human submarine. Whether pilots will accept the increased safety as a compensation for the added encumbrance of the clothing is a question which only pilots themselves can decide.

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and Drills
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AIRCRAFT FINANCE

WHITEHEAD AIRCRAFT (1917), LTD.

In my notes of last week I asked Mr. Whitehead two questions of public interest relating to this company, in connection with the company's advertisements, which still continue to appear in the Press. Up to the time of writing no reply has been received from Mr. Whitehead or from the company. In view of the whole circumstances this, by no means, is a matter for surprise. Correspondence continues to arrive from readers of this article, which demands that further queries should be put. There are further important details which require elucidation. Over and above the capitalisation of £1,000,000, there would appear to be two mortgages, a first mortgage of £150,000 and a second mortgage of £80,000, which apparently form part of the original purchase consideration. But since the incorporation further mortgages have been created, one for £1,400 and another for £2,900, and, further, the records show that the company have also contracted to take over all the liabilities of the old company. In view of all these mortgage and prior charges ranking in front of the shareholders, it would be interesting to publish details showing how far this company thereby becomes further involved.

Notwithstanding the official advertisement of the company, to the effect that a prospectus was in course of preparation, and that steps were being taken to obtain Treasury consent for a public issue of its share capital, I am informed that there has been filed with the Registrar of Companies "*a statement in lieu of prospectus.*" This statement sets out that the estimated preliminary expenses of the company amount to £6,000. Some explanation of these contradictory facts appear necessary. In my comments regarding this company, published in The Aeroplane of Nov. 7th, I drew attention to certain clauses of the memorandum and articles of association, which I characterised as "novel in connection with English companies." Relative to this, a correspondent writes to point out that there are other clauses in the articles which are equally "novel," and cites the following :—

Article 164.—*The directors shall from time to time determine whether and to what extent and at what time and place, and under what condition and regulations, the accounts and books of the company or any of them shall be open to the inspection of members,* and no member shall have any right of inspecting any account or books or documents of the company, except as conferred by statute or authorised by the directors or by resolution of the company in general meeting.

Article 165.—At the ordinary general meeting in every year, but not at the first general meeting, the directors shall lay before the company a balance sheet (together with, *if they deem fit,* a profit and loss account signed by the auditors), containing a summary of the property and liabilities of the company, accompanied by a report of the board on the transactions of the company during the period covered by such accounts, balance sheet, and report, *shall be in the room in which such general meeting is held for the use of the members who shall attend. A copy thereof may also be sent to the members of the company* in the manner in which notices are hereinafter directed to be served on members.

The "Financier," in commenting upon this company, says :—

The advertising of the Whitehead Aircraft (1917), Limited, in advance of a prospectus issue is manifestly designed to influence the investment of capital by persistent suggestion. Everybody knows that there is a wonderful future for aviation, and everybody perceives that we are on the eve of a great industrial development in connection therewith. It does not follow, however, that whoever asks for capital on such a plea is entitled to the blind confidence of investors. It is far more likely than not that the public who have been influenced by the advertising propaganda of the Whitehead Aircraft (1917), Limited, have not taken the trouble to go to Somerset House for the purpose of examining the particulars there available concerning the company. If they did, and if they found that the control of a £1,000,000 capital company was absolutely vested in one man for life, with the power of nominating his vice-regents and his dynastic successor, would they part with their money on such terms? *It is positively unthinkable.*

If Mr. Whitehead wants the company to be managed as a purely private concern, under his sole dictatorship, he had better be left to provide the capital himself. *To ask the public to subscribe the money in such circumstances is sheer effrontery.*

I repeat what I wrote previously :—

Young as is the aeroplane industry, there has already been sufficient money lost by the investing public in aeroplane ventures, and the future, more particularly the near future, demands very careful watching if the industry is to take its proper and appointed place in the ranks of sound industrial investments.

Readers of these columns may rely upon it that the future operations of this company *in relation to the public and its investments* will receive the particular attention which appear in the circumstances so essential.

ADDITIONAL FINANCE.

An interesting question is raised by "Scrutator," who wishes to know the best form of security to offer an intending investor who desires "participation in the profits with security" in a private company of which "Scrutator" is the principal owner and managing director. The point will be of interest to many readers of this article, as so many small companies rapidly trade beyond their immediate facilities. I am therefore replying at length. The best form of security to offer would be to create a debenture. This is a very useful form for securing capital wanted for extension, and appeals strongly to the capitalist as regulating his return and security. The interest is a fixed one, and may also carry a participation in profits. For instance, in the case of a manufacturing or trading concern, the debenture would carry a fixed rate of interest (say 6 per cent. per annum), and have the additional right to a small participation in the ultimate net profits, say, to the extent of 10 per cent. Generally speaking, a debenture is considered to be a floating security by way of mortgage, charged either upon specific assets, or upon the general assets of a limited liability company, including furniture, fixtures, and fittings, stock-in-trade, book debts, and uncalled capital (if any). A notice of a debenture or of an issue of debentures must be filed at Somerset House within twenty-one days after the date of issue, otherwise penalties are incurred, and the charge is not valid, and is useless as against a receiver or liquidator appointed for the purposes of the winding up of the company. Upon the filing of this notice a certificate is issued by the Registrar, certifying that all the requisite regulations have been complied with. This certificate must hang in the registered office of the company. A debenture may be created covering more than the amount required at the moment, and may be split up among several holders, who will each receive a debenture bond representing the amount contracted for, but each bond will be required to be separately stamped. The scale where the amount secured on each bond does not exceed £10 is 3d.; exceeding £10 and not exceeding £25, 8d.; exceeding £25 and not exceeding £50, 1s. 3d.; exceeding £50 and not exceeding £100, 2s. 6d.; exceeding £100 and not exceeding £150, 3s. 9d.; exceeding £150 and not exceeding £200, 5s.; exceeding £200 and not exceeding £250, 6s. 3d.; exceeding £250 and not exceeding £300, 7s. 6d.; for every additional £100 or fractional part of £100, 2s. 6d. A company may issue a debenture at a discount, e.g., a debenture securing the redemption of £100 may be issued by the company at £90 or any other sum agreed, but directors should, if possible, fix a rate at which the debenture shall be issued, and not deviate from it.

AIR RAID COMPENSATION.

This question is one of particular interest to the aircraft industry, as is clearly evidenced by the queries raised by correspondents on a number of points regarding the announcement recently made by the Chancellor of the Exchequer in the House of Commons on the subject of the State's scheme of insurance against damage by aircraft. The Government has at last announced the terms of compensation; unfortunately many of the details are not yet quite clear. Apparently, owners of property of an aggregate value not exceeding £500 will be compensated whether the property is insured under the Government scheme or not, while owners of property having an aggregate in excess of £500 will be compensated up to that amount without payment of premium, provided all value in excess thereof is insured under the Government scheme. This means, in effect, that the first £500 is insured free of charge, but no decision is given as to what will be done with regard to insurance premiums received in the past. The scheme takes effect as from Sept. 1st, 1917. One is disposed to imagine, therefore, that under no circumstances will there be any refund in respect of the premiums due prior to that date, but it would appear that policy holders whose renewal premiums have fallen due on or after Sept. 1st last will be entitled to a refund on any premium that they have paid

up to what represents a premium upon £500 insurance. The insurance to be provided will not be a full indemnity, as no compensation will be paid for money, securities, stamps, documents, manuscripts, or books of account, or for any consequential loss or theft, nor for any expenses incurred in preparing or supporting a claim, or for fees in connection with reinstatement of damaged property. Doubtless the existing Government aircraft policies are similarly safeguarded.

SHAREHOLDERS AIRCRAFT SYNDICATE, LTD.

Under the above unusual title notification is made of the registration on Nov. 21st of a private company, with a capital of £1,000, divided into 3,600 "A" shares of 5s. each, and 24,000 "B" shares of one penny each.

The objects are stated to be as follows:—"To organise, develop, and work aeroplane businesses, to enforce, as far as may be, the performance of contracts for the sale or purchase or otherwise of French and British patents, works, businesses, and goodwill relating to aircraft, to deal *in the share rights of the shareholders of the Bleriot Manufacturing Aircraft Company, Ltd.*"

The subscribers (each with one "A" share) are Doris Camp, 145, Mandeville Road, Enfield Wash, clerk; Elena K. Howden, 85, Dowanhill Road, Catford, S.E., clerk. The first directors are to be appointed by the subscribers, the qualification (except first directors) being 100 "A" or "B" shares. Their remuneration (except that of managing director) is £150 each per annum, plus 5 per cent. of the distributed profits divisible between them. The secretary (pro tem.) is J. S. Merchant, and the registered office is at 20, Northampton Park, Canonbury, N.1.

In view of the circumstances surrounding the original promotion of the Bleriot Manufacturing Aircraft Company, Ltd., I emphatically repeat the view expressed in connection with this matter, and published in these columns last week, namely:—

> An examination of the whole of the details compels the view that the shareholders, by the timely action of the Official Receiver, were fortunate in being able to save so much of the original capital they had subscribed, and with a further knowledge of the early manipulations and history of the promotion one is forced to the conclusion that the shareholders would be well advised to leave their interests in the company in the safe and competent hand of the Official Liquidator.

G. A.

COMPANIES OFFICIAL NOTICES.

DIVIDEND ANNOUNCEMENTS.

The directors of Ruston, Proctor, and Co., Ltd., have declared a dividend of 5 per cent. per annum on the ordinary shares, being the same as last year.

The Rolls-Royce report for the year ended Oct. 31st last gives the net profit at £82,640, against £44,171; dividend at the rate of 10 per cent. for the year, less tax.

NEW COMPANIES REGISTERED.

The files of the following new companies registered with the nominal capital of £5,000 and upwards are now available for inspection at Somerset House:—

Elms Aircraft and Motor Works, Ltd.—Nov. 14th, £10,000 in 9,750 preference shares of £1 each and 5,000 ordinary shares of 1s. each.

Hollow Structure and Aircraft Co, Ltd.—Nov. 20th, £55,000 in 25,000 participating preference shares of £1 each, and 60,000 ordinary shares of 10s. each. 4, Old Burlington Street, W.1.

DelaCombe, Marechal, and Hervieu, Ltd., 166, Piccadilly, London.—Registered Nov. 20th to acquire and take over as a going concern and carry on the business of manufacturers of and contractors for hangars and airship sheds, etc. Nominal capital £3,000 in 3,000 £1 shares.

ANSWERS TO CORRESPONDENTS.

A Financial Specialist will be pleased to answer in these columns (free of charge) inquiries on any subject affecting or relating to Investments, Stocks, Shares and Securities of Aircraft and kindred companies.

"DUBIOUS."—No trace of the Company you mention is possible under the title given. Have you any official printed documents you can send?

"PERPLEXED."—All transactions now are for "Cash," but a few days is invariably required to complete the transaction. If you are a buyer you need not pay until you receive delivery of the scrip, and, on the contrary, if you are a seller you deliver your scrip against payment. The customary fortnightly Stock Exchange settling days are suspended, and are now only recorded for the purpose of continuing arrangements in bargains opened before war broke out.

"CARRY-ON."—The Registrar of Joint Stock Companies would refuse to register a company having as a title or part of the title in which the words: "Royal," "Imperial," "King," "Emperor," "Queen," "Crown," or any similar word formed part, without the written consent of the Home Secretary.

"NOVICE."—An incorporated company is a "person" within the meaning of Acts of Parliament, but, as a famous judge once put it, "without a soul to be cursed or body to be kicked."

G. A.

PRODUCTION IN LANCASHIRE.

Mr. G. H. Roberts, M.P., Minister for Labour, speaking at Great Harwood (Lancashire), on Nov. 26th, said it was his intention to visit mills in the district to see how far they could be adapted to the manufacture of aeroplanes. Workers in the textile industry had not been able to keep abreast of the cost of living, and if it should be that shipping became more restricted and it proved impossible to get the required supplies of cotton into the country there might be a considerable amount of distress. It was, therefore, the intention to consider whether it would be possible to introduce the manufacture of aeroplanes into a number of Lancashire mills, otherwise labour might be displaced.

THE PRICE OF PETROL.

Following upon the recent 2½d. per gallon reduction (Oct. 11th) the companies forming the Pool Board (Petroleum Supplies) now announce that owing to further reductions in the Government War Risk Insurance upon vessels the wholesale price of all grades of war motor spirit will be reduced on Monday, November 26th.

The new wholesale prices effect a reduction of 2d. in the retail prices to the public of war motor spirit, the current prices of which in England and Wales are now as follows:—

No. 2 war motor spirit, 3s. 7d. per gallon.
No. 3 war motor spirit, 3s. 6d. per gallon.
Scotland and Ireland, 1d. additional.

A reduction of 1d. per gallon in the prices of petroleum oil has been made for the same reason as mentioned above, and this should lead to a corresponding reduction to the public.

BARIMAR ENTERPRISE.

The Board of Trade have now given formal sanction to a new company, with works in London and Liverpool, and known as The British Barimar-Thermit Welding Co., Ltd., to take up and exploit the Thermit welding process, which, prior to the war, was exclusively in German hands. Thermit is specially applicable for tramway welding and for the repair of heavy castings and machine parts, and it is the intention of Mr. C. W. Brett, the managing director and general manager of Barimar, Ltd., scientific welding engineers (who is largely responsible for the formation and management of the new company), to train disabled British soldiers and sailors to carry on the work. The registered offices of the new company are at 10, Poland Street, London, W.1.

CURRENT SHARE QUOTATIONS.

The following are the share quotations made up to Tuesday morning in each week of the principal companies engaged in the Aircraft Industry and Kindred Trades

Aircraft Mnfg. Co.	7% cum. pref. £1 ...	24-	25/-
	7% cum. & ptg. "B" pref., (11/- paid) ...	12/6	13 6
Armstrong (Sir W. G.) Whitworth & Co., Ltd.	4% cum. pref. £5...	3¼	3⅜
	5% 2nd. pref. £1 ...	17/-	18/-
	£1 ordinary	43/-	44/-
Austin Motor Co., Ltd.	7% cum. pref. £1...	18/-	19/-
	£1 ordinary	25/-	26/-
Birmingham Small Arms Co., Ltd.	£1 ordinary	53/-	54/-
	5% cum. "A" pref.	4⅛	4⅝
	6% cum. "B" pref.	19/-	20/-
Boulton & Paul, Ltd., 5% cum. pref. £1		¾	⅞
Brown Bros., Ltd., 6% cum. pref. £5...		4⅛	4⅝
Darracq (A) & Co., (1905) Ltd.	£1 ordinary ...	35/-	36/- x
	7% cum. pref. £1...	23/-	24/- x
Electric Construction Co., Ltd.	7% cum. pref. £1 ...	19/-	20/-
	£1 ordinary	24/-	25/-
Fellows Magneto pref.	Co., 8% cum. partip.	16/-	17/-
General Electric Co., Ltd.	6% cum. pref. £10 ...	10¼	11
	£10 ordinary	19¼	19⅞
Gwynnes, Ltd., 5% cum. pref.	... ...	91/-	92/-
Ordinary		8/3	8/6
Greenwood & Batley, Ltd., £10 ordinary		9¾	10
Humber, Ltd., 6% cum. pref. £1		19/-	20/-
£1 ordinary		18/-	19/-
Napier (D) & Son, Ltd., 7½% cum. pf. £1		18/-	19/-
Peter Hooker, Ltd., £1 7% cum. partic. 1st pref.		19 6	20/-
Rolls Royce, Ltd.. £1 ordinary		65/-	66/-
Rudge Whitworth, Ltd. £1 ordinary ...		53/-	54/-
Ruston, Proctor & Co., Ltd.	£1 ordinary	28/-	29/-
	5% cum. pref. £1 ...	17/-	17/6
Sunbeam Motor Car Co., Ltd., £1 ord...		84/-	85/-
Straker Squire, Ltd. (1913), £1 ordinary		23/-	24/-
S. Smith & Son, Ltd. (Motor Accessories) £1 ordinary		28/-	29/-
Triplex Safety Glass, £1 ordinary... ...		23/-	24/-
Vickers, Ltd., 5% pref. stock...		78	82
5% pref. shares.	£1 ...	17/6	18/6
£1 ordinary		43/-	44/-
Wm. Beardmore & Co., Ltd., 6% c. pf.	£1	19/-	19,6

GENERAL INFORMATION.

Armstrong, Whitworth (1916).
Austin Motor (1916).
B'ham. Small Arms (1915-16).
Rolls Royce.
Rudge Whitworth.
Straker-Squire (1915).
Sunbeam Motor.
Thorneycroft (J. I.) & Co.
Vickers (1915 and 1916).

Owing to the difficulty of estimating liabilities under Finance and Munitions Acts, the accounts will not be ready until a later date.

x—ex dividend

THE SIGN OF ASCOL EFFICIENT SERVICE

A.G.S. PARTS!



A VIEW OF THE NEW STORES AT ASCOL HOUSE.

FOR COMPLETE ILLUSTRATED STOCK & QUOTATION LIST for A.G.S. and other Aircraft Parts, see "AIRCRAFT SUPPLIES," our Fortnightly House Journal. ISSUED FREE to the Aircraft Industry and the Air Services on receipt of applications on business or official paper.

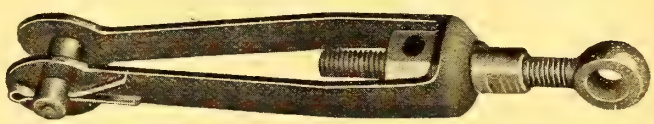
VOLUME 2, No. 12 Now Ready, also contains illustrated articles and several original charts specially prepared for the use of Aircraft Manufacturers. Enquiry Bureau, Details of New Items, &c., &c.

D.H.6. SPECIAL EYEBOLTS.—We can now give delivery from stock of 500 D.H.6. Special Eyebolts for Main Planes, Drawing Number 9064, as illustrated,



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STOCK-TAKING. Please note that our Offices and Stores will be closed on Monday next, DECEMBER 3rd, for stock-taking purposes.

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—— Deliveries in the London District by Motor Vans. ——

DELIVERY FROM STOCK OF **THE PART THAT HOLDS YOU UP!**

(*Continued from page* 1570.)

Depot Comdr.—Lt. (temp. Maj.) M. Spicer, North'd R., from a Park Comdr., and to be temp. Lt.-Col. whilst so empld., Sept. 27th.

Park Comdr.—Temp. Capt. H. J. Newton-Clare, Gen. List, from an Equipment Officer, 1st Cl., and to be temp. Maj. whilst so empld., Oct. 16th.

Special Appt.—(Graded as an Equipment Officer, 1st Cl., whilst holding the appt.).—Lt. (temp. Capt.) E. G. Landon, Spec. Res., from a Flt. Comdr., and to retain his temp. rank whilst so empld., June 15th.

Schools of Instrn.—Schools of Mil. Aeronautics.—Asst. Instrs.—(Graded as Equipment Officers, 2nd Cl.).—Temp. Sec. Lt. D. S. Allan, Gen. List, a Flying Officer, and to be temp. Lt. whilst so empld., Aug. 31st. Temp. Sec. Lt. J. Edwards, Gen List, a Flying Officer (Observer), and to be temp. Lt. whilst so empld., Sept. 12th. Temp. Capt. C. Fairbairn, Gen. List, a Flt Comdr., Sept. 24th. Temp. Lt. G. L. Sly, Gen. List, a Flying Officer (Observer), Sept. 26th. Temp. Lt. H. W. Durtnell, Gen. List, a Flying Officer, Sept. 30th. Lt. C. L. Willcox, Spec. Res., from an Asst. Instr. (graded as a Flying Officer), School of Mil Aeronautics, Oct. 2nd. Temp. Sec. Lt. H. B. Howe, Gen. List, a Flying Officer, and to be temp. Lt. whilst so empld., Oct. 17th.

Gen. List.—To be temp. Sec. Lt.:—Sjt. A. G. Pointing, from R.F.C., Oct. 18th.

* * *

The King has been pleased to confer the following rewards for gallantry and distinguished service in the field. The acts of gallantry for which the decorations have been awarded will be announced in the "London Gazette" as early as practicable:—

Bar to the Military Cross.

T./Capt. H. G. E. Luchford, M.C., Gen. List, and R.F.C. (M.C. gazetted Oct. 27th).
Sec. Lt. (T./Lt.) V. R. S. White, M.C., S. Staffs. R., Spec Res., and R.F.C. (M.C. gazetted May 26th).

The Military Cross.

Lt. (T./Capt.) D. S. Hall, Arg. and Suth'd Highrs. and R.F.C
Capt. F. H. Laurence, Worc. R., Spec. Res. and R.F.C.
T./Lt. J. S. Michie, Gen. List and R.F.C.
Sec. Lt. J. D. Payne, Gen. List and R.F.C.
Sec. Lt. (T./Capt.) F. Sowrey, D.S.O., R. Fus. and R.F.C.

* * *

In the Special Order of the Day issued under date Nov. 25th by Field-Marshal Sir Douglas Haig, the following passage occurs:—

In this battle the Tanks have for the first time been afforded an opportunity of working in large numbers and of showing their special value under conditions suitable to them. Without them the complete surprise gained would not have been possible, and could not even have been attempted. Their performances have entirely justified the trust placed in them.

Infantry, artillery, and aircraft have co-operated with the efficiency and complete devotion to duty in which they never fail.

The cavalry has co-operated with the other arms with excellent results.

FROM THE COURT CIRCULAR.

Buckingham Palace, Nov. 21st.

The King conferred decorations as follows:—

The Distinguished Service Cross.

Sqdn. Comdr. Bertram Huskisson, R.N.A.S.
Flt.-Comdr. Charles Edwards, R.N.A.S.
Flt.-Comdr. Charles Booker, R.N.A.S.
Actg. Flt.-Comdr. Charles Sproatt, R.N.A.S.
Flt.-Lt. Frederic Walker, R.N.A.S.
Flt.-Lt. John Jones, R.N.A.S.
Flt.-Lt. Joseph Fall, R.N.A.S.
Flt.-Lt. Victor Gibbs, R.N.A.S

The Military Cross.

Capt. Geoffrey Buck, London Regt. and R.F.C.
Capt. Keith Caldwell, R.F.C.
Sec. Lt. Frank Rushton, Essex Regt., attd. Royal West Kent Regt., attd. R.F.C.
Lt. F. McCreary, R.F.C.

* * *

The following Officer had the honour of being received by the King this morning, when His Majesty invested him with the Insignia of the Distinguished Service Order:—

Sqdn. Comdr. Geoffrey Bromet, R.N.

Buckingham Palace, Nov. 23rd.

The King, attended by Comdr. Sir Charles Cust, Bt., R.N., and Lieut.-Colonel Clive Wigram (Equerries in Waiting), visited the Ministry of Munitions Aero Engine Instructional Workshop, Twickenham, this morning, and was received by Mr. M. J. Currie (Director of Training Section, Labour Supply Department of Ministry of Munitions), who presented Mr. H. Purdy (Honorary Adviser to Training Section, Labour Supply Department), the Manager, and other Members of the Staff.

His Majesty afterwards proceeded to the National Physical Laboratory, Teddington, and was received by Sir Richard Glazebrook (Director), who presented the Members of the Administrative Staff.

Buckingham Palace, Nov. 24th.

The King and Queen, attended by the Countess Fortescue and Commander Sir Charles Cust, Bt., R.N., visited the Royal Flying Corps Hospital, at 82, Eaton Square, this afternoon.

Buckingham Palace, Nov. 26th.

The King, attended by Commander Sir Charles Cust, Bt., R.N., and Lieut.-Col. Clive Wigram (Equerries in Waiting), visited Messrs. Gwynnes, Limited, this morning, where His Majesty was received by Mr. N. Gwynne (Managing Director) and Staff.

The King afterwards proceeded to Messrs. D. Napier and Sons, Limited, and was there received by Mr. H. T. Vane (Managing Director) and other Members of the Firm.

Major C. S. Paulet (representing the Ministry of Munitions), Major I. B. Davson, and Captain G. W. Williamson (Department of Aeronautical Supplies) were also in attendance upon His Majesty.

NAVAL.

The following appointments have been made in the Royal Naval Air Service:—

Nov. 23rd.—Sub-Lt., R.N.V.R. (Temp.).—K. W. J. Oldridge, entered as Proby. Flt. Officer (temp.) seny. Nov. 4th.

Messrs. A. Clayton and N. Barker both granted temp. commissions as Lt. (R.N.V.R.), seny. respectively Nov. 15th and 26th, and both apptd. to "President II," addl., for R.N.A.S.

L.M. (S.).—N. J. Bell, granted temp. commission as Lt. (R.N.V.R.), seny. Nov. 26th.

Mr. H. S. Smith granted temp. commission at Lt. (R.N.V.R.), seny. Nov. 26th.

Nov. 24th.—Act. A.M. (1).—H. E. Craymer, granted temp. commission as Lt. (R.N.V.R.), seny. Nov. 20th.

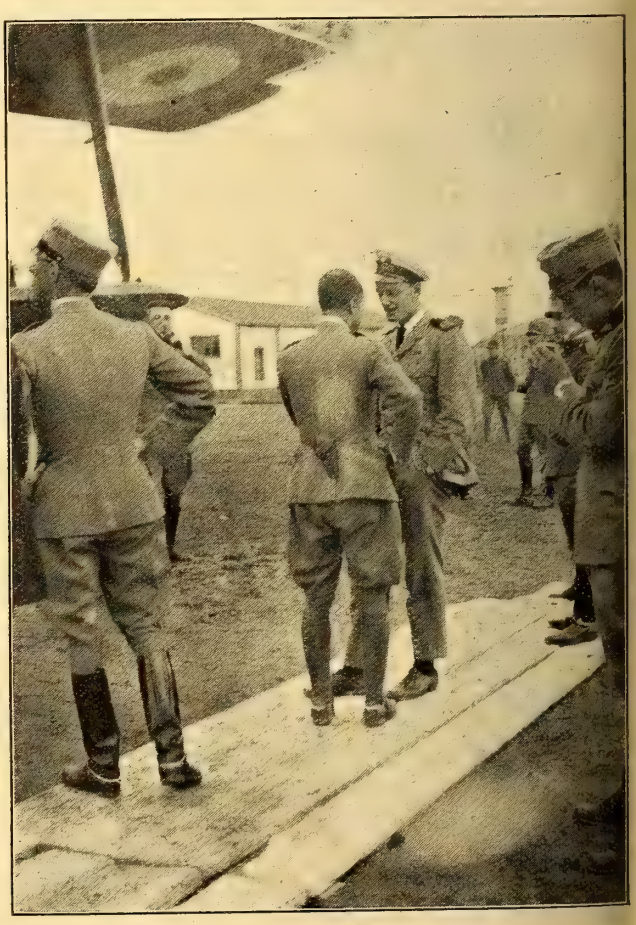
Temp commission (R.N.V.R.) has been granted to the following, seny. as stated:—Lt. W. S. Stacey, Nov. 16th.

Admiralty Communiqué

Nov. 24th.—On Nov. 23rd, in the course of fighter patrols by the Royal Naval Air Service, two enemy aircraft were probably destroyed and one driven down completely out of control.

On November 20th also, one enemy machine was destroyed.

All our machines have returned safely.



The O.C. Handley Page Biplane in Rome, with Italian Aviation Officers.

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TELEGRAMS: "GWYNNE, LONDON."

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

Official Communique.

Nov. 22nd.—It will be remembered that during July a successful air attack was carried out on objectives in the vicinity of Constantinople. This was accomplished by a large British bombing aeroplane of the Handley Page type, which flew from England, where she was constructed, to one of our bases in the Mediterranean.

The journey was accomplished in a series of eight flights. Among other places, stops were made at Lyons and Rome. The total distance flown was nearly 2,000 miles, the machine being actually in the air for just over 31 hours.

During some parts of the flight strong winds and heavy rainstorms were experienced, and for one stretch of over 200 miles the route lay over mountainous country where it would have been impossible for any machine to land.

Nevertheless the aeroplane carried out its journey practically to time table, which is believed to be easily a world's record for a cross-country journey, and also for the weight carried for the distance, the machine being self-contained as regards engine and aeroplane spares.

The Casualty List.

Reported Nov. 21st.

Previously reported Missing, now reported Killed.—MacLennan, Actg. Flt. Comdr. G., R.N.

Bray, Flt. Sub-Lt. F., R.N.

Previously reported Missing, now reported Prisoner and Wounded.—Abbott, Flt. Sub-Lt. E. D., R.N.

Reported Nov. 23rd.

Accidentally Killed.—Bickle, G. W., Act. Air Mech., 1st Gde. F.9027; Reardon, T. C. M., P.O., Aircraftsman, F.14688.

Reported Nov. 26th.

Accidentally Killed.—Airey, Flt Sub-Lt. H. F., R.N.

Accidentally Injured.—Carroll, Flt. Sub-Lt. R. E, R.N.

PERSONAL NOTICES.

Deaths.

BRAY.—Flt. Sub-Lt. Frank Bray, R.N., who was previously reported missing, and is now reported killed in action on July 15th, was the eldest son of the late John W. Bray, of the Hall, Sealby, Scarborough, and of Mrs. Bray, of Woodlea, Shadwell Lane, Leeds, and grandson of the late George Bray, of Belmont, Headingley, Leeds. He was 18 years of age.

CLIVE.—Flt. Sub-Lt. Reginald Dennis Clive, R.N., elder son of Mr. and Mrs. H. R. Clive, Fieldgate Lawn, Kenilworth, died, as the result of a flying accident, at Edinburgh, on November 10th, aged 19. He was educated at Arden House School, Henley in Arden, at Repton School, and was a member of Caius College, Cambridge. A superior officer writes:—"From what evidence I have been able to get, he appears to have sacrificed his life in order to avoid injuring some lads who were playing in the field in which he was landing."

HASSAN.—Stanley E. H. Hassan (late R.N.A.S.), who died on Nov. 24th at Bournemouth, was the fifth son of the late Isach Hassan, and Mrs. Hassan, of 11, Warrington Crescent, W.9.

Engagement.

WARNEFORD—CHAMBERS.—The engagement is announced of Flt. Comdr. Walter Kemeys Francis Goodall Warneford, R.N., son of Mr. and Mrs. Walter Warneford, of Lansdowne House, Huyton, Lancs, to Pansy Grahame Chambers, daughter of Capt. W. Grahame Chambers, late Gordon Highlanders, Canada, now Lt.-Comdr., R.N., and of Ardmay, Arrocha.

Marriage.

ROWDON—RUSHTON.—On Nov. 23rd, at St. Peter's, Brockley, Mr. Robert Rowden (R.N.A.S.), only son of Mr. and Mrs. Alfred Rowdon, of 8, Stockwell Terrace, Clapham, was married to Muriel, youngest daughter of Mr. and Mrs. Frank Rushton, of 121, Tressillian Road, Brockley, by the Rev. Whitfield Daukes.

The Secretary of the Admiralty announces that it has been decided, with the King's approval, that officers of the Royal Naval Reserve and Royal Naval Volunteer Reserve attached to the Royal Naval Air Service (other than accountant officers, R.N.R.) are to wear the uniform of their rank, with the addition on each sleeve above the distinction lace, and on each shoulder strap, of a gilt badge consisting of an "A" with wings.

A drawing of the badge can be seen in the Admiralty Pattern Rooms, Broadway, Westminster.

* * *

Owing to a most regrettable and inexcusable printers' error, the name of Probationary Flight Officer B. E. Sugars, R.N., appeared in The Aeroplane of October 31st as being reported accidentally killed, under date of October 29th. One is glad to hear that Mr. Sugars has sustained the lesser misfortune of being accidentally injured, and one can only apologise most sincerely on behalf of the printers for the annoyance and concern to his friends and relatives which must have arisen as the result of the report of his death being so much exaggerated.

MILITARY.

G.H.Q. Communiqués.

Nov. 20th, 10.8 p.m.—The weather has become stormy and wet rendering the action of our aircraft very difficult.

On the 19th inst. the weather continued misty, with low clouds and little work in the air could be accomplished.

A few bombs were dropped in the enemy's lines and a number of ground targets were engaged with machine-gun fire from a low altitude.

One hostile machine was brought down in air fighting.

All our machines returned.

Nov. 21st, 10.5 p.m.—On the 20th inst. our aeroplanes attempted to work throughout the day in conjunction with our operations between St. Quentin and the River Scarpe.

Low clouds and mist and a strong westerly wind, with drizzle and occasional rain throughout the day, made it necessary for our pilots to fly at 50ft. from the ground. Even at that height they were at times quickly lost in the mist. Continual attempts were made to maintain contact with our advancing troops, but this was rendered almost impossible by the weather conditions.

Many bombs were dropped on the enemy's batteries, lorried aerodromes, transport, and railways. Batteries and small groups of infantry were attacked with machine-gun fire. Valuable information was gained, despite the very difficult conditions. Only five hostile machines were seen all day on the battle front.

Eleven of our machines are missing, their loss being due to the mist and the exceptionally low height at which they were compelled to fly.

Nov. 22nd, 10.25 p.m.—Further details received show that the attacks made on the 20th inst. on the enemy's infantry and transport by our low-flying pilots, including pilots from the Australian Squadrons, were most successful.

On the 21st inst. the weather was even more unsuitable for flying than on the previous day, but a number of successful reconnaissances of the enemy's lines of communication were carried out, and every endeavour was made to keep in touch with our infantry.

No enemy aeroplanes were encountered, and none of ours are missing.

Nov. 23rd, 9.6 p.m.—On the 22nd instant the bad weather continued, preventing all flying except at a very low height.

Our aeroplanes were very active in attacking hostile troops and transport on roads in the neighbourhood of Cambrai with bombs and machine-gun fire.

A number of fights took place with the enemy's low-flying machines, three of which were brought down, while two others were driven down out of control. One hostile balloon also was brought down in flames.

Five of our aeroplanes are missing.

Nov. 24th, 9.35 p.m.—On the 23rd inst. our aeroplanes operated with our infantry in their attacks, flying up and down the line of our advancing troops at a low height, and helping with machine-gun fire to disperse the enemy's infantry.

Hostile reinforcements and transport on the roads were also attacked, and many bombs were dropped behind the battle front on important railway junctions at which rolling stock was collected and detraining in progress.

Australian squadrons again took part in this work, which was carried out continuously throughout the day, although the weather at times made flying almost impossible.

The enemy's aeroplanes showed more activity in attacking our bombing and low-flying machines.

During the night a short spell of fine weather enabled our machines to continue the bombing of the enemy's railway stations.

In air fighting six hostile machines were brought down.

Nine of our aeroplanes are missing, two of which were seen to collide over the enemy's lines.

Nov. 25th, 9.27 p.m.—On the 24th inst. the weather was bad, but several reconnaissances were carried out by our aeroplanes. In the battle area bombs were dropped on the enemy, and machine-gun fire was opened against his troops.

In the afternoon the violence of the gale made it almost impossible for machines to leave the ground.

One of our aeroplanes has not returned.

War Office Communiqué.

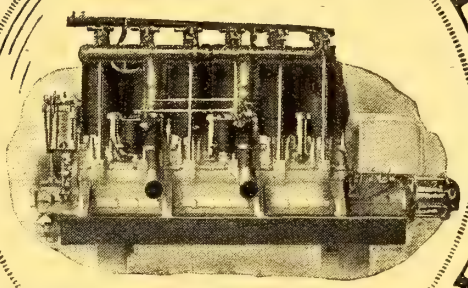
Nov. 23rd.—The G.O.C. the British Forces in Macedonia reports:—

Bombing raids have been carried out against Tusculu (west of Demirhassar), Ernekeui (south-west of Demirhissar), and Veznik (east of Seres), all on the Struma front.

The Royal Naval Air Service shot down a hostile aeroplane which crashed behind the enemy's lines.

An enemy machine, which attempted to attack one of our balloons, was brought down behind our lines, the pilot being killed.

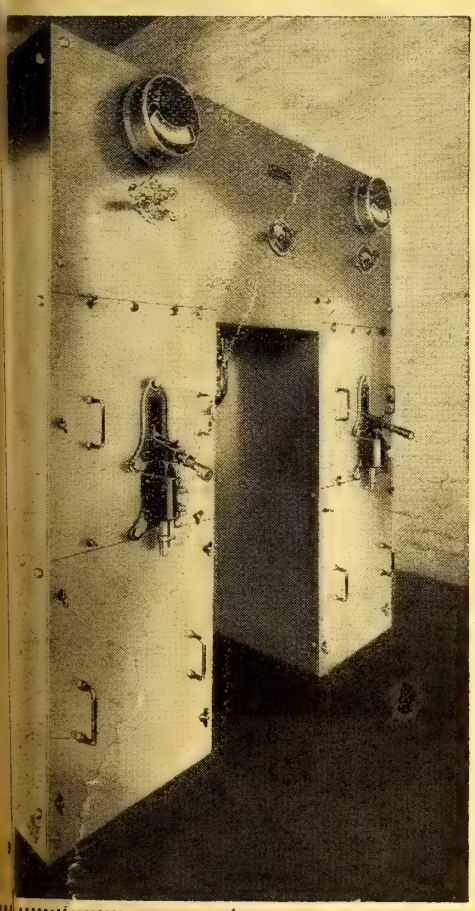
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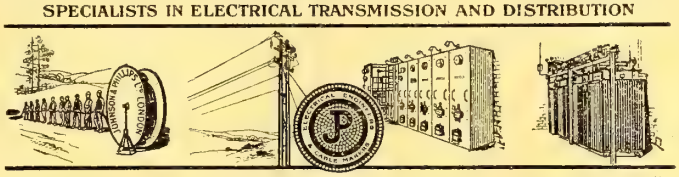
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THE CASUALTY LIST.

Reported Nov. 21st.

KILLED.—Cragg, Sec. Lt. S. B., R.F.C.
Morris, Sec. Lt. E. W., R.F.C.
Williams, Sec. Lt. N. E., Lond. R., attd. R.F.C.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—Crafter, Lt. J., M.C., Lond. R., attd. R.F.C.

WOUNDED.—Pickford, Sec. Lt. H. A., W. Yorks R., attd. R.F.C.
Stewart, Sec. Lt. C. E., R.F.A., attd. R.F.C.
Turnbull, Sec. Lt. R. B. E., R.F.C.

MISSING.—Barnes, Capt. E. E., R.E., attd. R.F.C.
Casswell, Lt. E. D. S., Rif. Brig., attd. R.F.C.
Cobbold, Lt. F. R. C., R.F.C.
Durrad, Capt. F. A., A.S.C., attd. R.F.C.
Kingsland, Sec. Lt. W. R., R.F.C.
McCullough, Sec. Lt. F. J., R.G.A., attd. R.F.C.
Meggitt, Lt. W. G., M.C., Welsh R., attd. R.F.C.
Middleton, Sec. Lt. L. W., R.F.C.
Pruden, Sec. Lt. W. C., R.F.C.
Robinson, Sec. Lt. H. G., R.F.C.
Thompson, Sec. Lt. A., R.F.C.

CORRECTION.—WOUNDED.—Anderson, Sec. Lt. S. St. K., R.F.C., should read :—Anderson, Sec. Lt. F. St. K., R.F.C.

Reported Nov. 22nd.

DIED OF WOUNDS.—Ballantyne, Sec. Lt. A. J., R.F.C.

WOUNDED.—Statham, Sec. Lt. W. H., Leic. Regt., attd. R.F.C.

PREVIOUSLY REPORTED MISSING, NOW REPORTED DIED OF WOUNDS AS PRISONERS IN GERMAN HANDS.—Cruickshank,, Sec. Lt. K. G., R.F.C.
Thomas, Lt. C. R., R.F.C.

PREVIOUSLY REPORTED PRISONER, NOW REPORTED DIED OF WOUNDS AS PRISONER IN GERMAN HANDS.—Wilkinson, Lt. D. S., R.F.C.

PREVIOUSLY REPORTED PRISONER, NOW REPORTED WOUNDED AND PRISONER IN GERMAN HANDS.—Kellogg, Sec. Lt. W. B., R.F.C.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONERS IN GERMAN HANDS.—Armstrong, Sec. Lt. G. W., R.F.C.
Braithwaite, Sec. Lt. B. F., R.F.C.
Carroll, Sec. Lt. C. E., R.G.A., attd. R.F.C.
Edwards, Sec. Lt. G. R., R.F.C.
Fitzgerald, Sec. Lt. J. J., R.F.C.
Gilbert, Sec. Lt. R. S., R.F.C.
Hill, Lt. R. F., A.S.C., attd. R.F.C.
Lord, Sec. Lt. T. V., R.F.C.
Matthewson, Sec. Lt. R. W. B., R.F.C.
Newcomb, Sec. Lt. M., R.F.C.
Norton, Sec. Lt. P. C., R.F.C.
Peacock, Sec. Lt. M. A., R.F.C.
Richardson, Sec. Lt. R. H., R.F.C.
Stevenson, Sec. Lt. J. G., R.F.C.
Talbot, Sec. Lt. F. W., Worc. Regt., attd. R.F.C.
Taylor, Sec. Lt. A., R.F.C.
Vick, Sec. Lt. W. W., R.F.C.
Ward, Sec. Lt. A. A., R.F.A., attd. R.F.C.

CANADIAN CONTINGENT.—PREVIOUSLY REPORTED MISSING, NOW REPORTED DIED.—Nasmyth, Lt. A. W., Alberta Regt., attd. R.F.C.

MISSING.—Deans, Lt. J. H., Cent. Ont. Regt., attd. R.F.C.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER IN GERMAN HANDS.—Smythe, Lt. C., M.C., Can. F.A., attd. R.F.C.

Reported Nov. 23rd.

KILLED.—Fuller, Sec. Lt. C. S., R.F.C.
Murray, Sec. Lt. W. R., R.F.C.
West, Sec. Lt. M. S., R.F.C.

WOUNDED.—Couve, Sec. Lt. N., R.F.C.
Matthews, Sec. Lt. H. T., Yeomanry, attd. R.F.C.

INDIAN FORCE.—MISSING.—McConnell, Sec. Lt. H. L. C. I.A.R.O., attd. R.F.C.

AUSTRALIAN FORCE.—KILLED.—Bowd, Lt. H. W., Fl. Corps.

WOUNDED.—Morrison, Sec. Lt. D. C., Fl. Corps.

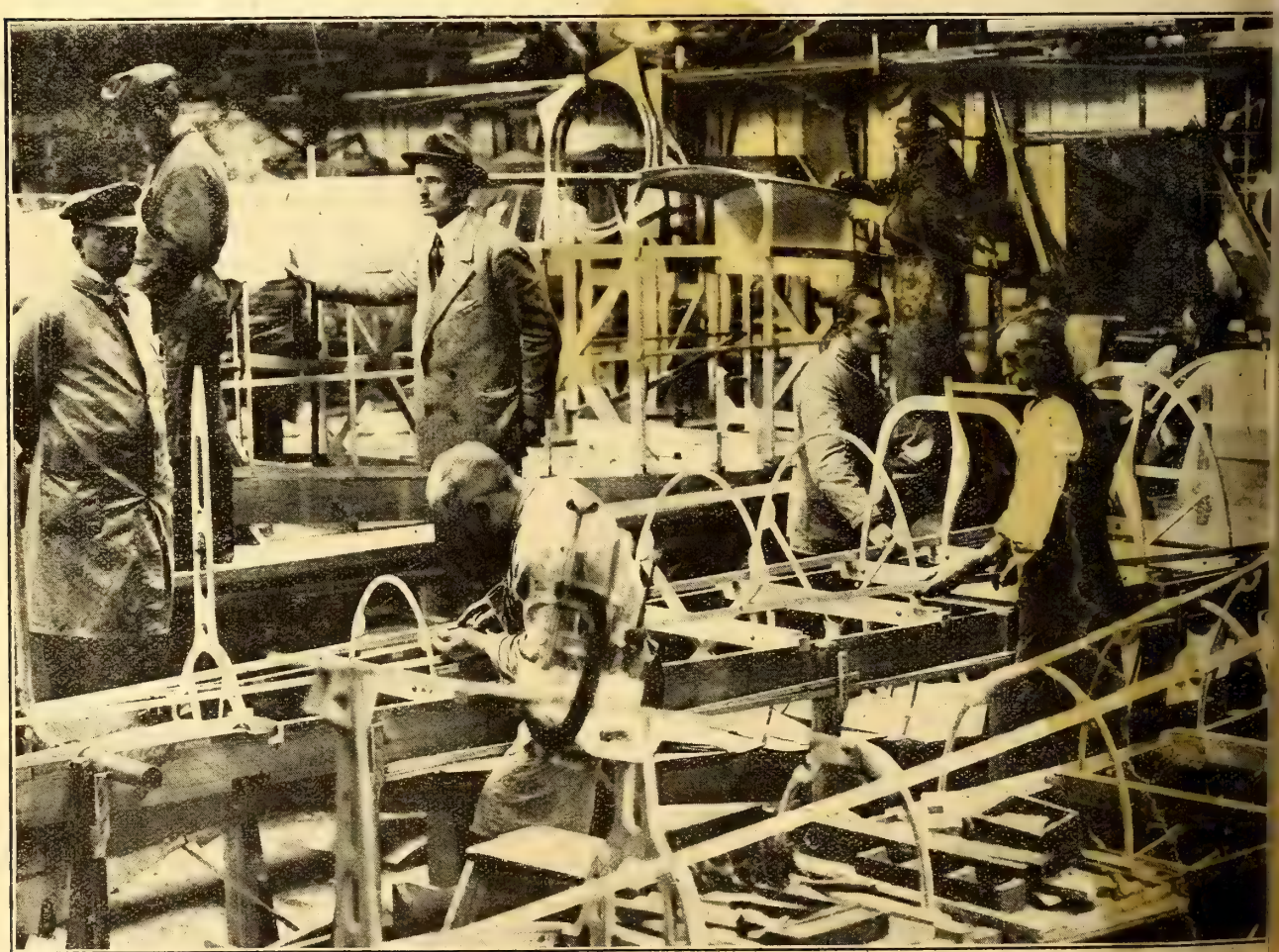
Reported Nov. 24th.

KILLED.—Gimingham, Capt. C. H., Herts Regt., attd. R.F.C.
Hyslop, Sec. Lt. N. S., R.F.C.
Sewell, Lt. W. A., Bord. Regt., attd. R.F.C.
Symonds, Sec. Lt. S. L. H., R.F.C.

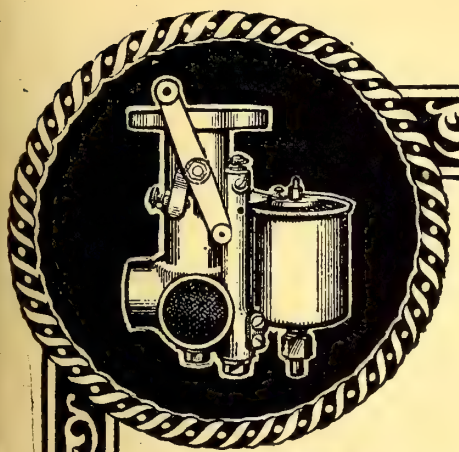
PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—Carlyle, Sec. Lt. W. M., R.F.C.
Lloyd, Lt. D. R. C., R.F.C.
Rook, Sec. Lt. F. W., R.F.C.

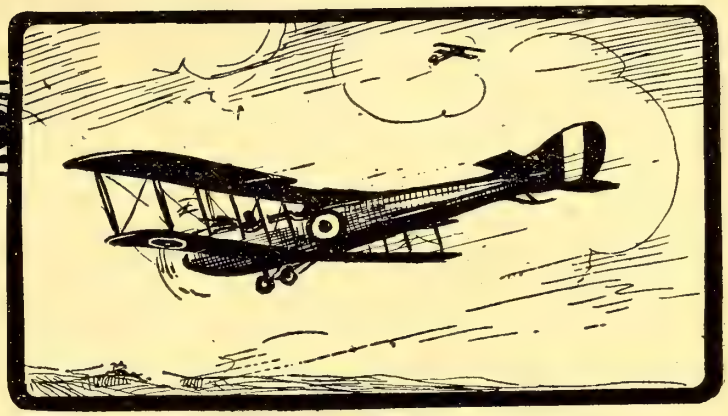
DIED OF WOUNDS.—Galloway, Sec. Lt. F. P., R.F.C.

WOUNDED.—Booth, Sec. Lt. E. B., R.F.C.
Farrier, Sec. Lt. A. V., D.C.L.I., attd. R.F.C.



WHAT WE ARE UP AGAINST.—Part of the Albatros Fuselage Shop, showing the monocoque fuselages in course of construction.

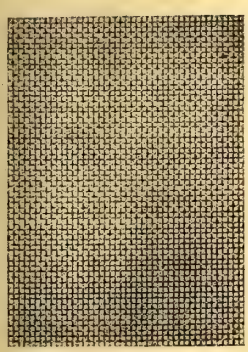


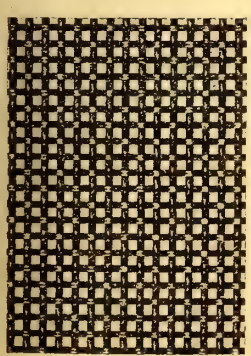


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Hanmer, Sec. Lt. H. I., R.F.C.
Head, Lt. B., North'd Fus., attd. R.F.C.
Higham, Sec. Lt. J. A., R.F.C.
Pitt, Lt. G. H., Yeo., attd. R.F.C.
Womersley, Lt. J. H. G., R.G.A., attd. R.F.C.

Missing.—Morrison, Lt. K. S., R.F.A., attd. R.F.C.
Scott, Lt. D. H., M.C., R.F.C.

Previously reported Wounded and Prisoner, now reported Died whilst Interned in Switzerland.—Harvey, Lt. W. A., Norf. Regt., attd. R.F.C.

Previously reported Prisoner, now reported Wounded and Prisoner in German Hands.—Hall, Sec. Lt. W. E., Lond. Regt., attd., R.F.C.

Previously reported Missing, now reported Prisoner in German Hands.—Wellby, Sec. Lt. H. S., Lond Regt., attd. R.F.C.

Canadian Contingent.—Previously reported Missing, now reported Died.—Allen, Lt. S. H., Cent. Ont. Regt., attd. R.F.C.

Missing.—Cockburn, Lt. G. A., Can. F.A., attd. R.F.C.

Previously reported Missing, now reported Prisoner in German Hands.—Chambers, Lt. W. D., Can. A.S.C., attd. R.F.C.

Reported Nov. 26th.

Previously reported Missing, believed Killed, now reported Killed.—Cotterill, Lt. H. G. K., R.F.A., attd. R.F.C.
Devenish, Lt. G. W., R.F.A., attd. R.F.C.

Previously reported Missing, now reported Killed.—Baumann, Sec. Lt. M. O., R.F.C.
Duxbury, Sec. Lt. H. C., R.F.C.
Evans, Lt. B., R.F.C.
Gaulter, Lt. C. V., R. Lanc. Regt., attd. R.F.C.
Gleed, Sec. Lt. J. V. A., R.F.C.
Halse, Sec. Lt. C. H., R.F.C.
Leete, Sec. Lt. S. J., Worc. R., attd. R.F.C.
Lownds, Sec. Lt. R. H., R.F.C.

Died of Wounds.—Needham, Sec. Lt. J. W. D., R.F.C.

Wounded.—Gawthorne, Sec. Lt. L. E., R.F.C.
Johnson, Sec. Lt. R. H., R.F.C.
Petty, Capt. H. J., R.F.C.

Wounded and Prisoner in Turkish Hands.—Newton, Sec. Lt. A. E., Egyptian Camel Corps, attd. R.N.A.S.

Previously reported Prisoners, now reported Wounded and Prisoners in German Hands.—Leighton, Capt. R. T., Yeo., attd. R.F.C.
Rushworth, Capt. H. M., Lond. Regt., attd. R.F.C.

Previously reported Missing, now reported Prisoner in German Hands.—Fosse, Sec. Lt. E. L., R. War. Regt., attd. R.F.C.

Reported Nov. 27th.

Killed.—Morse, Sec. Lt. C. C., R.F.C.

Wounded.—Hendrie, Sec. Lt. K. G. P., R.F.C.
Palmer, Sec. Lt. C. D., A. and S. High., attd. R.F.C.

Canadian Contingent.—Killed.—Best, Lt. F. W., M.G.C., attd. R.F.C.
Revill, Capt. J. A., Alta. R., attd. R.F.C.

Accidentally Killed.—Robertson, Lt. J. S., Man. R., attd. R.F.C.
Rutledge, Lt. S. A., Sask. R., attd. R.F.C.

Wounded.—Griffiths, Lt. W. J. E., F.A., attd. R.F.C.

* * *

Casualties among N.C.O.'s and Men.
The dates are those of the official list.

Killed.

Nov. 15th.—R.F.C.—Clark 5859 Sjt. H. (Hetton-le-Hole); Rose 50208 2nd Cl. Air Mech. E. T. (Finsbury Park, N.).
Nov. 16th.—Morley 65142 2nd Cl. Air Mech. A. (South Levenshulme).

Previously Missing, now reported Killed,

Nov. 13th.—R.F.C.—Cook 1920 Sjt. E. A. (Fratton); Giles 61924 Sjt. A. (Newbury).

Died.

Nov. 13th.—R.F.C.—Shelley 33235 1st Cl. Air Mech. A. E. (Wolverhampton).

Wounded.

Nov. 12th.—R.F.C.—Collins 43612 2nd Cl. Air Mech. H. G. (South Dulwich, S.E.); Crowder 31214 2nd Cl. Air Mech. J. (Macclesfield); Hart 30198 2nd Cl. Air Mech. C. W. (Clapham Park, S.W.); Runciman 47208 Cpl. W. W. (Glasgow); Smith 42130 2nd Cl. Air Mech. H. (Leeds).

Missing.

Nov. 13th.—R.F.C.—Hewitt 94294 2nd Cl. Air Mech. W. (Portadown).
Nov. 16th.—Bury 10018 2nd Cl. Air Mech. T. H. (Streatham, S.W.).

Previously Missing, now reported Died as Prisoner of War in Turkish Hands.

Nov. 12th.—R.F.C.—Taylor 34145 Sjt. A. (Tooting, S.W.).

Australian Imperial Force.
Died.

Nov. 14th.—A.F.C.—Ferreira 1137 R. A.

Correction.—Oct. 11th.—For McBain, 29730, 2nd Class Air Mech. D. (Govan), read McBain, 29730, 1st Class Air Mech. D. (Govan).

PERSONAL NOTICES.

Deaths.

BAKEWELL.—Lt. G. Bakewell, R.F.C., who has died of wounds, was the only son of Mr. and Mrs. George Bakewell, of Warwick, and was on the staff of Lloyds Bank at Leamington. He enlisted in the early days of the war, and while serving with the Warwickshire Yeomanry, so distinguished himself in a battle with the Senussi that he was given a commission, being gazetted to the Border Regt., with which he had seen much service on the Western front. Recently he was transferred to the R.F.C., and, having won his wings, returned to the front about three weeks ago.

BEST.—Lt. Frank B. Best, A.S.C., attached R.F.C., was reported missing on July 29th, after a fight in which he was overtaken by a severe storm. Later he was reported in a German newspaper to have been found dead in his machine. He joined the A.S.C. at the outbreak of war, obtained his commission in August, 1914, and went to France in February, 1915, with the first Territorial division to go to the front. In 1916 he went to Ireland when the rebellion broke out, and was afterwards transferred to the R.F.C. He quickly obtained his wings, and was sent to the front again last June. He was educated at Bedales School, Petersfield, and later spent eighteen months in Düsseldorf and Paris. He was a director of Best and Lloyd, Limited.

BRUCE.—Capt. C. W. Bruce, R.F.C., was killed while flying at Rochford on Nov. 22nd, through his machine nose-diving.

Captain Charles William Bruce, Gordon Highlanders, attd. R.F.C., was the younger son of Mr. and Mrs. Archibald Bruce, and grandson of Sir William Smythe, Bt., of Acton Burnell Park, Shropshire.

DUNNETT.—Lt. R. F. Dunnett, M.C., Worcestershire Regt., attached R.F.C., who was accidentally killed whilst flying on Nov. 17th, was the eldest son of Mr. and Mrs. F. C. Dunnett, of Hartley Wintney.

ELLIS.—Capt. Bryan Grogan Langley Ellis, R.F.A., attached R.F.C., who was killed on Oct. 13th, in his 21st year, was the younger son of Mr. and Mrs. Langley Ellis, of 3, Addison Gardens, Kensington. He was educated at Eastbourne College and Elizabeth College, Guernsey, for both of which he shot at Bisley for the Ashburton Shield. On leaving college he joined the Guernsey Militia (Artillery), and after six months he was gazetted lieutenant R.F.A., and was sent to France in May, 1915. After serving with the artillery for eighteen months he was attached to the R.F.C., and last June was promoted captain.

GIMINGHAM.—Capt. Charles Henry Gimingham, Herts Regt., attached R.F.C., who was killed in action on Nov. 9th, was the youngest son of Mrs. Mary Christmas, of Harpenden, Herts, and of the late Charles Henry Gimingham.

LIVOCK.—Lt. Eric Stuart Livock, Queen's Regt. and R.F.C., youngest son of the late Mr. H. A. Livock and of Mrs. Livock, of 31, Broom Water, Teddington, has been killed in action. Mr. Livock, who was 22 years of age, joined the colours at the commencement of the war, and received his commission in Sept., 1915. He proceeded to France in July last, and fell some three weeks later, on his return to the front after his first leave in October.

MARVIN.—Sec. Lt. Henry Leslie Marvin, R.F.C., who was previously reported missing, and is now reported killed in action, on Oct. 26th, while flying abroad, was the youngest son of Mr. and Mrs. H. W. Marvin, Coulsdon, Surrey. He was 22 years of age.

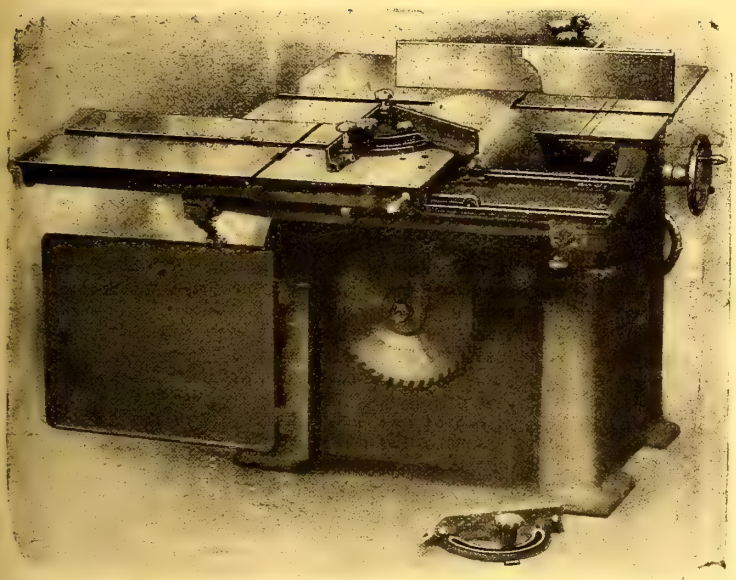
MORSE.—Sec. Lt. Christopher Charles Morse, R.F.C., who was killed in action on Nov. 14th, was the youngest son of Mr. and Mrs. George H. Morse, Thorpe St. Andrew, Norfolk. He was 18 years of age.

RUSSELL.—Sec. Lt. John Hepburn Russell, R.F.C., whose death, as the result of a collision, was announced a few weeks ago, was the son of the late John Russell, of Banker, Glasgow. Educated at the Glasgow High School and University, he graduated B.Sc. "in absentia" whilst at the Dardanelles. Before joining the R.F.C., Mr. Russell was a machine-gunner in the R.N.A.C.D., and won the Conspicuous Gallantry Medal at the Cape Helles landing, at the same time being badly wounded. He also saw fighting with the R.N. armoured cars against the Senussi in Egypt.

SEWELL.—Lt. William Allan Sewell, Border Regt., attd. R.F.C., killed in action on Nov. 12th, was 23 years of age, and a graduate of Keble College, Oxford. He was the youngest son of the Rev. T. J. and Mrs. Sewell, of Lynsted Vicarage, near Sittingbourne, and had promotion to the rank of lieutenant in June of last year.

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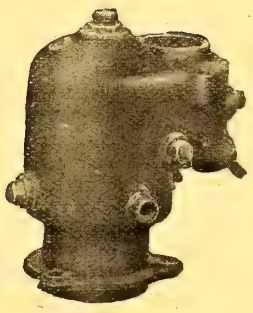


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SAUNDBY.—Sec. Lt. William Spencer FitzRobert Saundby, Yorkshire Regt., attd. R.F.C., entered the Army through Sandhurst in the spring of 1916 and joined the R.F.C. He went to the front in Oct. of the same year, and was reported missing on Nov. 17th. It was believed that he had had a forced landing and been taken prisoner, but as nothing has since been heard of him this hope has been abandoned. He was the youngest son of Dr. and Mrs. Robert Saundby, of 68, Hagley Road, Edgbaston, and was educated at West House School, Edgbaston, and King Edward's High School, Birmingham. He was in his 19th year.

SKEFFINGTON.—Sec. Lt. H. Neville S. Skeffington, R.F.C., previously reported missing, is now officially declared to have been killed over the German lines on July 28th, 1917. He was the second son of Mr. Martin S. Skeffington, of 6, Leinster Mansions, Hampstead, and 34, Southampton Street, Strand, and was 33 years of age. He was educated at Charterhouse, and was associated for some years with the publishing firm of Skeffington and Son. He afterwards spent some time in the Colonies, and landed at Brisbane two days before the outbreak of war. He enlisted at once in the Australian Field Engineers, and subsequently served with the Australian Forces in Egypt, Gallipoli, and later in France, where he received his commission. He volunteered for the Royal Flying Corps, and after training was sent to the front on July 14th last.

WALE.—Sec. Lt. Alan Ernest Wale, R.F.C., who died on Nov. 23rd as the result of an aeroplane accident, was the youngest son of Mr. and Mrs. Chas. T. Wale, of Laverock, Blagden's Lane, Old Southgate, N. He was 18 years of age, and had served for two years with Middlesex Imperial Yeomanry on active service in Egypt and the Balkans.

WATERS.—Sec. Lt. John Patrick Waters, R.F.C., who was killed on Nov. 18th, was 18 years of age, and the only son of Brig.-Gen. W. H.-H. Waters, C.V.O., C.M.G., and of Mrs. Waters. He was gazetted to the R.F.C. last July.

Engagements.

PENDER—SMITH.—The engagement is announced of Capt. Ian McAlister Moffatt Pender, Seaforth Highlanders and R.F.C., youngest son of Mr. and Mrs. John Pender, Onich, Great Bookham, Surrey, and Lorna Ledlie, younger daughter of the late William Purves Smith and of Mrs. Smith, of Ravenswood, East St. Kilda, Melbourne, Australia.

STREATFEILD—BOOTH.—The engagement is announced of Captain G. H. B. Streatfeild, Durham Light Infantry and R.F.C., younger son of Major H. S. Streatfeild, R.F.A., of Ryhope, County Durham, and Barlay, Balmaclellan, Kirkcudbrightshire, and Marjorie, younger daughter of Mr. Charles Booth, of 10, St. Bede's Terrace, Sunderland.

WRIGHT—FLETCHER.—An engagement is announced between Lt. Francis Whitworth Wright, R.F.C., son of the late John Hodgson Wright, of Halifax, Yorks, and Joyce Margaret, second daughter of Dr. and Mrs. H. Morley Fletcher, 98, Harley Street, W.1.

Marriages.

COLMAN—JONES.—On Nov. 19th, 1917, at St. Mark's Church, Salisbury, Lt. Eric Fraser Colman, S. Staffordshire Regt. and R.F.C., was married to Elizabeth Norris, youngest daughter of the late Thomas George Jones, of Kilbracken, Co. Leitrim, Ireland.

DE ROEMER—LIDDELL.—On Wednesday, Nov. 21st, at St. Andrew's Church, Major C. W. de Roemer, R.F.A., attached R.F.C., only son of Major and Mrs. de Roemer, of Lime Park, Hurstmonceaux, Sussex, was married to Audrey, eldest daughter of the late Charles Lyon Liddell and Mrs. Liddell, of The Place House, Peasmarsh, Sussex, by the Rev. E. St. George Schomberg.

HAYMAN—CUMBERLAND.—On Nov. 21st, at St. Matthias' Church, Richmond, William George Edward Hayman, Lt., R.F.C., eldest son of Mr. and Mrs. Hayman, of Folkestone, was married to Dorothy Frances, youngest daughter of Mr. and Mrs. Cumberland, of Richmond.

MILLER—BURN.—On Nov. 14th, at St. Barnabas Church, Cambridge, Donald Campbell, Capt., R.F.C., only son of Mr. and Mrs. Miller, Birmingham, was married to Hilda, elder daughter of Dr. and Mrs. Burn, Cambridge.

MASON—RIGGALL.—On Nov. 13th, at St. Mark's Church, Purley, Captain Eric Barnes Mason, R.F.C., second son of the late Mr. W. L. Mason, F.R.I.B.A., of Skelgarth, Ambleside, was married to Alice Pauline, daughter of Mr. G. A. Riggall, Ulceby Grange, Alford, Lincs.

MUSSON—HUTTON.—On Nov. 19th, at the Brompton Oratory, Sec. Lt. John McDougall Musson, R.F.C., elder son of Mr. and Mrs. J. T. Musson, of Teignmouth, South Devon, was married to Moya, only daughter of Mr. and Mrs. W. H. Hutton, of 3, St. Andrews Road, West Kensington, W., by the Rev. Father Ross.

Births.

HEYMAN.—On Nov. 22nd, at Hoddesdon, the wife of Capt. W. Heyman, Hussars, R.F.C., of a son, still-born.

HUMPHREYS.—On Nov. 24th, at Moorlands Bungalow, East Boldre, Hants, to Evelyn, wife of F. J. W. Humphreys, Lt., R.F.C.—a daughter.

LALE.—On Nov. 20th, at Brighton, the wife of Lt. H. P. Lale, R.F.C., of a son.

PAIN.—On Nov. 15th, at 5, Upper Wimpole Street, W., the wife of Capt. J. W. Pain, R.F.C., of a son.

News has been received by Mrs. Gubbin, of 1, Queen's Avenue, Clifton, that her husband, Sec. Lt. J. R. F. Gubbin, R.F.C., only son of the late Dr. Gubbin, of Redland Road, Bristol, and son-in-law of Mr. H. F. Cooper, secretary of the Bristol Tramways and Carriage Co., Ltd., has been missing since Oct. 29th last. This officer has been on active service as a pilot, in the Balkans, for the past twelve months.

* * *

Re the late Lt. Eric J. Roberts, R.F.C., of Sydney, Australia. Will anyone knowing anything of the personal effects of the above, stored in London, May, 1916, please communicate with Dr. Roberts, Royal Infirmary, Chester?

* * *

The special correspondent of the "Times," writing from the British front on Nov. 19th, says:—

One of our flying men recently had an extraordinary experience, when he was lost in one of the thick mists which sometimes come so suddenly over Flanders. When out in company with another machine, he saw two enemy aeroplanes, and rose into a higher stratum of clouds to attack from above. There he lost his companion, and, as the mist thickened below him, he failed to get in touch with the enemy. He tried to fly west by the compass in order to get home, but evidently his compass was quite wrong. He came to a big town with a river by it, and saw parties of Germans working by the river. Supposing them to be gangs of prisoners, he circled round the town and finally chose a landing place on the common. Wisely, he remained in his seat and kept his engine running till a peasant came along, when he asked whether he was in the French or the British area. To his astonishment, he found he was in Germany, and the peasant indicated the direction of the front.

Without waiting to ask any more questions the aviator rose, and had to fly over the town to get away. By this time he had been seen, and anti-aircraft guns and machine-guns opened on him. There was a great hue and cry, and unfortunately he had no bombs to drop. He could only run for it, which he did. He passed by enemy aeroplanes in the mist, but was himself undetected by them. At intervals he dipped down close to the ground, but wherever he came down there were still German uniforms on the roads and in the fields, so he had to rise again. Guiding himself by the direction of the wind as it drifted the smoke of the chimneys below him, he kept his course, and at last came to a town which he recognised as Tournai. Thence it was easy to get to Lille, and so back over our lines at Armentières. Here to his joy he saw men in khaki. He was almost at his last drop of petrol, and came down on the first favourable spot he saw.

Where he had been neither he nor anybody else knows, but the incident shows, with our aviators as adventurous as they are, how simple is the explanation when you read in the communiqué that "one of our machines is missing."

FRANCE.

Official Communiqués.

Nov. 20th.—Army of the Orient. British aviators dropped bombs in the Struma Valley, and caused an explosion at Tusculu.

Nov. 23rd.—Two German aeroplanes were brought down yesterday, one after a fight with one of our pilots and the other by our machine-gun fire.

Army of the Orient.—An enemy aeroplane, piloted by the German Lt. von Eschwege, was brought down.

Nov. 24th.—Dunkirk was bombarded by aeroplanes last night. There were no casualties, and the material damage done was insignificant.

Army of the Orient.—Our aviators have dropped bombs on the enemy establishments at Vasarcica, on the Prilep road.

GERMANY.

Official Communiqués.

Nov. 21st.—In the engagement during the English advance into the German Bight on Nov. 17th, German aeroplanes also took part in the fight and bombarded the large English warships.

Nov. 22nd.—Western Front.—Lieut. Böhme, by the shooting down of an enemy aeroplane, has gained his 22nd aerial victory.

Bulgarian Front.—Lieut. von Eschwege brought down an enemy captive balloon, thus gaining his 20th aerial victory.

Nov. 24th.—Since Nov. 20th our opponents have lost 27 aeroplanes in aerial battle and by anti-aircraft fire. Capt. Baron von Richthofen has gained his 62nd, Lt. Baron von Richthofen his 26th, and Lt. Bongartz his 24th aerial victory.

Nov. 26th.—Our infantry, battle, and pursuing aviators, who in spite of the violent storm and rain, successfully intervened i

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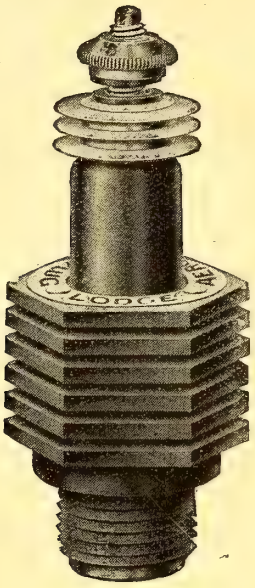


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ITALY.

Official Communiqués.

Nov. 20th.—Our bombardment flights effectively and repeatedly bombed enemy columns in movement along the road in the Lower Val Piave, in the neighbourhood of Quero; during the night airships dropped several bombs on enemy bivouacs at Torre di Mosto (Livenza) and in the neighbourhood of the Motta di Livenza bridge, which was damaged. Two enemy machines were brought down.

Nov. 21st.—Our aircraft carried out effective bombardment operations and fought several duels with hostile aeroplanes, as a result of which two enemy machines were brought down.

Nov. 25th.—Near Mount Grappa two enemy aeroplanes were brought down by one of our aviators.

* * *

The following semi-official statement was issued on Nov. 22nd:

At the same time our seaplanes continue to carry out each day reconnaissance operations and bombardments against the enemy's vessels, troops, and works, to direct the fire of the guns, and have been engaged in violent aerial combats.

On Nov. 16th a number of chaser aeroplanes attacked a group of enemy machines with a numerous escort. An enemy torpedo-boat destroyer was hit by an incendiary bomb from one of our seaplanes, and one of the enemy aeroplanes was brought down, with one of its wings broken, by two of our machines (pilots Serjt. Levi and Serjt. Cornillon). On Nov. 18th two of our seaplanes gave chase to three enemy aeroplanes engaged in reconnaissance on the Sile front and brought down the machine K 211, the aviators being taken by air as prisoners to Venice.

On Nov. 19th another of our seaplanes, while making a photographic reconnaissance, was attacked by two enemy machines. It bravely gave battle, and brought down one of them. On the same day an enemy torpedo-boat destroyer near Punto di Tagliamento was attacked by one of our seaplanes and hit by a bomb. On Nov. 20th another enemy aeroplane, after a battle in the air, was forced to descend rapidly on the other side of the Piave.

* * *

Signor d'Annunzio is reported, according to the "Figaro," to be missing. It is feared that he may have fallen into the hands of the enemy.

An Exchange Telegraph Company's message from Amsterdam, on Nov. 22nd, says that the German papers state that Gabriele d'Annunzio, the Italian poet, was taken prisoner during the last Tagliamento battles. There is no confirmation of this report. In any case he could not have been captured at the Tagliamento, for in a telegram from Venice, dated Nov. 18th, which appeared on Nov. 21st, Mr. Perceval Gibbon gave particulars of an interview with Signor d'Annunzio, in which the latter talked about the Piave line.

BULGARIA.

Official Communiqués.

Nov. 21st.—Three enemy aeroplanes were brought down in aerial combat between the Tcherna and the Vardar, and a fourth was shot down by our artillery in the Struma Valley.

Nov. 22nd.—The German Sub-Lt. von Eschwege was hit by the enemy's anti-aircraft fire and perished gloriously in the air. The Bulgarian Army, which rejoiced at all times at the exploits of this incomparable champion of the air, will cherish him in affectionate and lasting memory.

BELGIUM.

Official Communiqué.

Nov. 21st.—On Tuesday morning a German aeroplane came down in flames near Dixmude.

GREECE.

It is reported that another Greek naval flying officer has been awarded a British honour for bravery against the Turk. Sub-Lt. Pantelef Psychas was acting as observer to Sub-Lt. Argyropoulos, when the latter was killed while engaging an enemy aeroplane. Sub-Lt. Psychas was himself twice wounded, and his machine fell into the sea. Despite his own injuries, he did all in his power to save his pilot. Sub-Lt. Psychas was eventually rescued, and has now received the Distinguished Service Cross for his gallantry.

AN HONOUR FOR MR. ORVILLE WRIGHT.

The following letter has been received by the Duke of Connaught, President of the Royal Society of Arts, from Mr. Orville Wright, Dayton, Ohio, U.S.A.:—

"I have the pleasure of acknowledging the receipt of your Royal Highness's letter and the Albert Medal of the Royal Society of Arts, which were forwarded to me through the British Ambassador at Washington. I wish to express my appreciation of the honour conferred upon me by the Royal Society of Arts as a recognition of the work of my brother Wilbur and myself towards the solution of the problem of flight. I appreciate with the utmost gratification the honour of being placed by your society among such men as those to whom this coveted medal has been awarded in years past."

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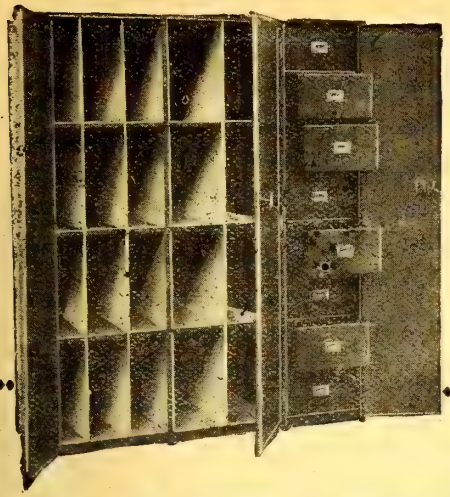
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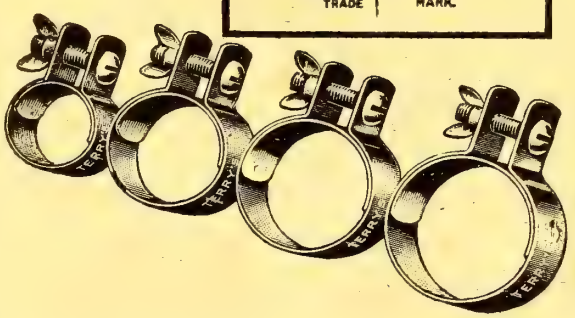
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AVIATION IN NEW ZEALAND.

Aeronautical activities in New Zealand have not been killed by the war; in fact, there are signs that in the near future a good deal may be done in this direction.

At the present time, the firm of Walsh Brothers are conducting a seaplane school in Auckland Harbour, which receives official recognition. Pupils who pass their tests in a satisfactory manner are sent to Europe to complete their training for the R.F.C. One would be led to think that pupils trained on a seaplane would be more suited for the R.N.A.S.; but, apparently, the authorities think differently.

Some dozens of pupils have already been sent across, and one or two have earned distinction.

The equipment of the school consists of two Curtiss boats, with 90 h.p. Curtiss motors. A third boat, built on the premises, is completed, and more are under construction.

Of course, the school is at present on a small scale when compared with British standards, but it represents considerable achievement when one considers the difficulties that have had to be overcome. The brothers Walsh started to build their first machine about 1912, making everything, except the engine. There is no record of their earlier achievements, but by 1915 they had taught themselves to fly on one of their own machines fitted with a 60 h.p. le Rhône engine.

They then began to take pupils, using this machine and later a Caudron biplane with a 60 h.p. Anzani fitted with floats. They had the usual mishaps with these machines, but persevered until the first Curtiss came to hand. The second Curtiss was built up from the spare planes of the first machine, and a boat of their own construction. The machine just completed is built on Curtiss lines, but the top plane is longer than the lower, and carries the ailerons. The workmanship, especially in the boat, is excellent, says a correspondent.

The Canterbury (N.Z.) Aviation Company, Ltd., was formed last year to equip and run a flying school in Canterbury, where the frozen lambs originate. Ground was secured at Sockburn, four miles or so out of Christchurch, and a Caudron with 60 h.p. Anzani imported.

Mr. Hill, who learned to fly at Hendon, was engaged as instructor and manager. The necessary sheds and a well-equipped workshop are now complete, and instruction has been actually started. At present, however, things are at a standstill, because the Anzani gave out, and the machine hit a wire fence in landing. Another machine, fitted with a 45 h.p. Anzani is nearing completion.

The immediate difficulty in the way of flying in New Zealand is that all engines have to be imported, and considerable delay is, therefore, inevitable in obtaining engines and spares.

PORTUGUESE AVIATION.

From the "Revista Aeronautica," of Lisbon:—

Four officers in training for military pilots were sent to the United States in 1915 to attend the Signal Corps Aviation School in S. Diego, California, but when Portugal declared war, they could no longer be trained in the States, so returned to Europe, finishing their instruction at the Chartres School. All of them obtained their certificates between September and December, 1916, and went on to the Caudron School at Juvisy, where three of them obtained the School certificate in February, 1917, the fourth having been recalled to the Lisbon War Ministry for organisation work.

A fifth officer took the Caudron courses, which included training in artillery reconnaissance, chasing, fighting, and aerial acrobatics. These officers were from artillery, cavalry, and infantry units. [From which it appears that Portugal is only beginning to form a flying corps.—Ed.]

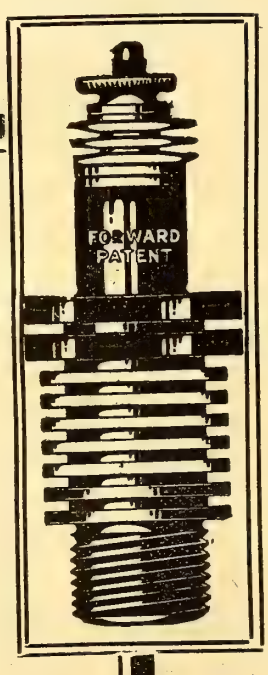
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A factory, plant and machinery are in course of construction for the manufacture of Triplex glass in America, and will shortly be in operation. Meanwhile, a member of the syndicate, Mr. W. J. Finlay, is in London, and will deal with all inquiries. Communications should be addressed to him, care of the Triplex Safety Glass Co., Ltd., 1, Albemarle Street, W.1.

BRITISH MAGNETOS

It is announced that the Handley Page biplane used on the journey from England to bomb Constantinople last July was fitted with magnetos of British manufacture, which were made by members of the British Ignition Apparatus Association.



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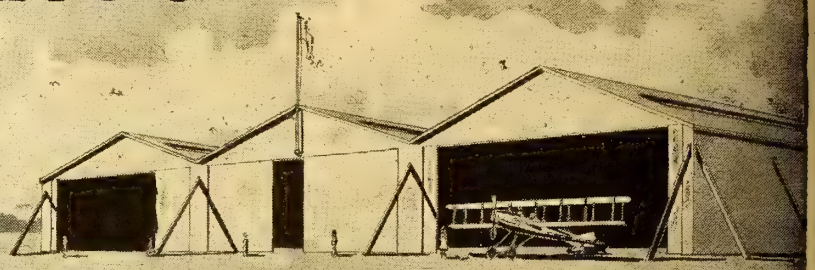
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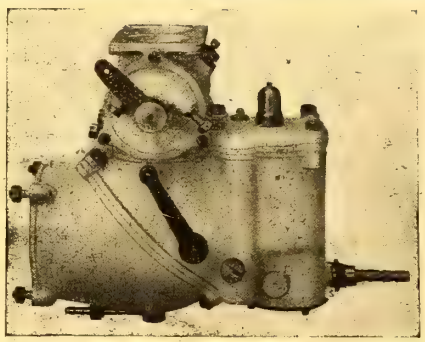
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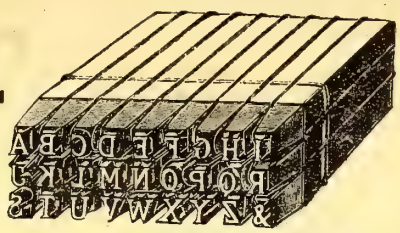
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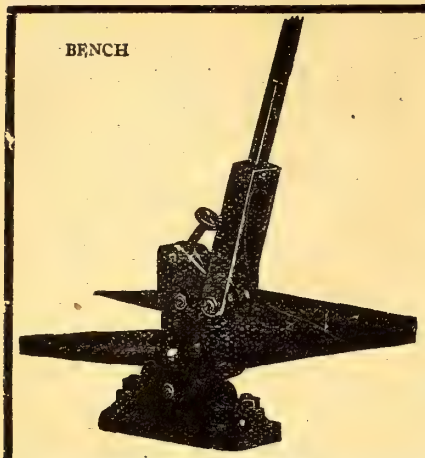
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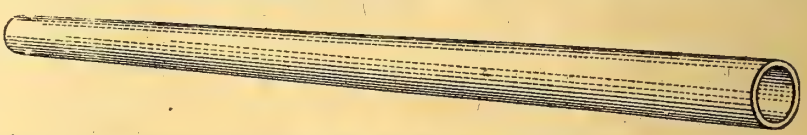
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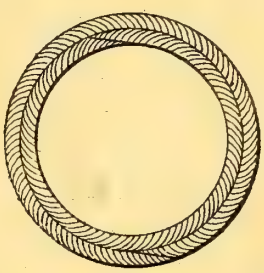
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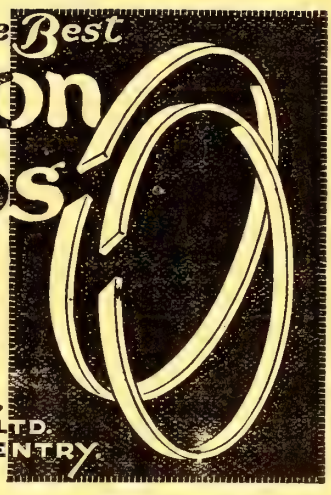
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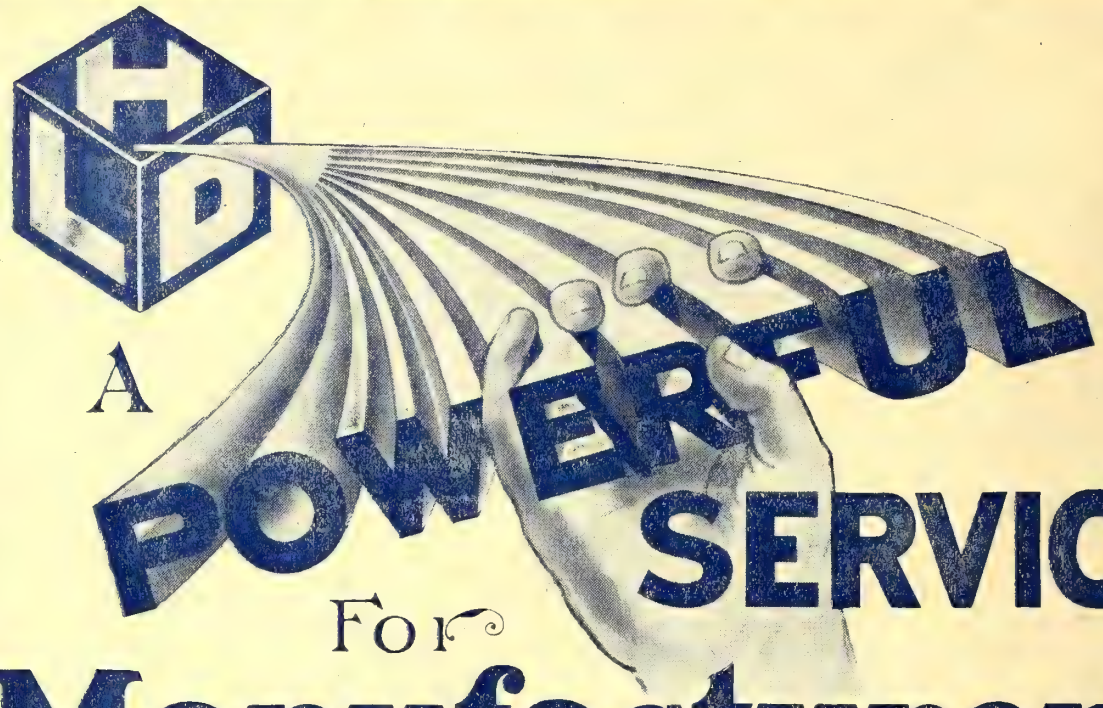
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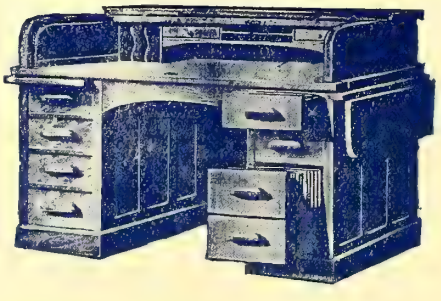
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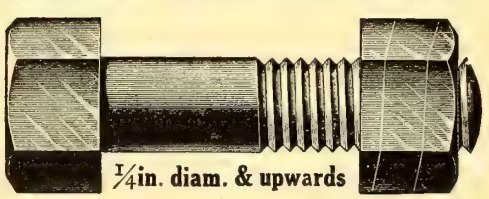
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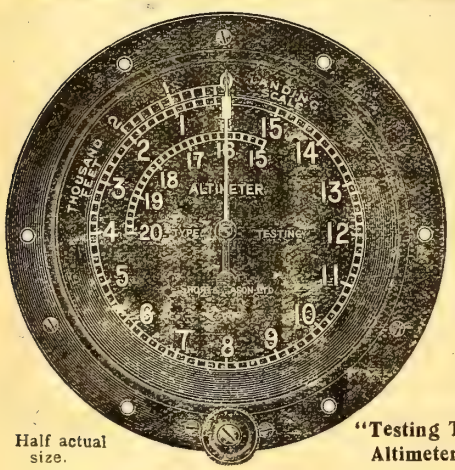
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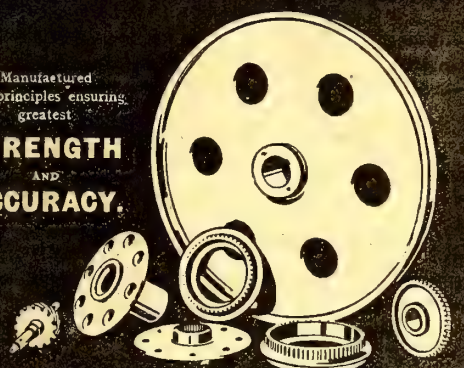
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ON COVENTRY.

Coventry people will tell you with pride that their town is the Centre of England. Cutting out the pride as unjustifiable, their contention is correct. Coventry is like the centre of a wheel, which stands still while the rest of the organism moves round it. Coventry is like the centre of a vortex in a vessel of swirling liquid, which collects all the dregs from the rest of the vessel. Coventry is the centre of England—Angle-and-Saxon-land—being roughly 100 miles each from the strong and virile Celts and Norsemen of the North Country, the predatory Welsh in the West, the industrious Danish plus Dutch inhabitants of the Eastern Counties, and the civilised Celts and Romans and Gauls of the South and South-West. Coventry is essentially English. Coventry is to-day the Centre of the contempt of the British Empire, because its aircraft shirkers went on strike at one of the most critical moments of the war. Coventry is at last getting what it deserves.

Something over twenty years ago I worked in Coventry. It does not seem that the people of Coventry have altered much since. In those days the aborigines of Coventry were the most self-satisfied, self-opinionated, self-conceited, self-centred, pig-headed, and muddle-headed people of even Saxon England. Whatever Coventry thought or did was right in Coventry's eyes, just because Coventry thought so. One felt then as Cromwell must have felt when he said, "My brethren! In the name of Christ, I beseech you to think it possible that you may be mistaken." But Coventry never has been mistaken, according to Coventry's ideas.

None knows how old is the deadly disease of Coventry-ism. To be "sent to Coventry" has for many a day implied the punishment of social ostracism. Only those who have been compelled to live in Coventry understand the true cruelty of the literal execution of the sentence. It would be interesting to discover the particular phase of Coventry's history which gave rise to the phrase which has for centuries made Coventry infamous.

Coventry's favourite legend concerns the virtue of its people in refusing to look at Lady Godiva when she paraded the place *en déshabille*. The fact of the matter is that the legend is merely an allegory illustrating Coventry's refusal to face the naked truth about itself. Peeping Tom of the legend was really some intelligent being who tried to make Coventry see the truth, and was lynched as a reward.

Coventry's Losses.

Coventry once had the pick of the world's ribbon trade, and lost it through its own stupidity and conceit. Coventry once had the pick of the world's watch trade, and lost nearly all of it because it was too stupid to adopt modern machinery and business methods. Coventry once had the cycle trade to itself, and let other towns steal a great deal of it because Coventry would not accept modern ideas. Coventry had the first of the motor trade, and let the cream of it go. Coventry might have had the lead in the aircraft industry, being almost the first in the field to try to make aeroplanes and engines, and it let the business go to Bristol and Kingston and Weybridge and London and the North and the Eastern Counties and Scotland.

History repeats itself all over the world, but nowhere so regularly as in Coventry. Time and again "foreigners" from more intelligent parts of England and the rest of the world have come to Coventry and built up or given new life to an industry, and always Coventry itself has come out on top of them. Here and there brilliant business men have kept their firms well to the fore in their own particular trades, but thanks to their own ability and not to the intelligence of Coventry as a whole.

Coventry's Traitors.

To-day, in the hour of the Empire's greatest need, when Coventry might have justified its existence for once in a way, we have had tens of thousands of its workpeople on strike about nothing at all. They were already getting far more money than they could actually earn. They were not striking for more money, but for the recognition by their employers of what they call a principle. The idea of Coventry having any principles, except money-grubbing, is really funny.

How many of these strikers are under thirty years of age and fit for military service? They are the people who are making the trouble. Doubtless I shall be told that the strikers and strike-leaders are not all aborigines of Coventry. Very well then. Why did not the aborigines of Coventry, if they think so highly of Coventry's good name, go in and break the strike by doing the work that these men refused to do?

What Coventry May Expect.

It may be accepted roughly that it takes 4,000 man-hours to build an aeroplane, apart from the engine. That is to say, 400 men should turn out one aeroplane, or its equivalent, per day of 10 hours. 40,000 men should turn out 100 aeroplanes per day, or 600 per week. 40,000 men on strike for a week represent a loss to the King's Services of the equivalent of 600 aeroplanes.

When the Germans are good and ready to invade England by air in the Spring, they may well find London fully protected against air raids by the present highly effective organisation. It will then be a small matter for their new and improved aeroplanes to cover an extra hundred miles or so to some other munition centre. Obviously Coventry is the next nearest. When German bombs begin dropping around, Coventry will wish that it had for its defence those 600 aeroplanes or so, of which its strike deprived the country last week. Then

Coventry will get precious little sympathy from the rest of the British Empire, but it may be convinced, for the first time in its existence, that it was wrong.

The Time for the Strong Hand.

Meantime, and pending this just retribution, Coventry has deprived the British Army of much-needed aircraft. It is more than time that the Government, if it intends to govern at all, took hold of the situation with a strong hand. Slackers and strikers in aircraft factories should be run straight into the Army, especially the ringleaders of the trouble. The Army would soon kick them into being men.

A shop-steward does not carry any weight in the trenches, except the weight of his pack, and such a weight has been carried for three years and more by better men than he can ever hope to be. One gathers that aircraft workers object to being paid piecework—"payment by results" they call it. As these precious shop-stewards have been deliberately preventing results, piecework or otherwise, let them try how they like trench-work at a shilling a day. Later on, doubtless, the Hun raiders' bombs will pay Coventry as a whole for the results of last week's disgraceful work.

Well-meaning people have tried, by writing pathetic letters about disloyalty to comrades in the trenches, to persuade Coventry to do its duty. A chaplain has actually flown back from the Front to preach to Coventry about it. One might as well preach to the self-confident Hun in the front-line trenches. So long as Coventry has a sufficiency of food and alcohol and women it is not going to listen to preaching.

The Government was quick enough to shoot Sinn-Feiners, who, after all, were merely agricultural strikers with the pluck to put up a fight. And the Government acted very rightly in doing so, though Heaven knows the Irish had far more reason for striking than Coventry had, besides being up against an age-long racial enemy. The Sinn-Feiners were, at any rate, honest rebels against a foreign Government, and were not traitors to their own kith and kin as Coventry has been. If shooting was good enough for Irish rebels, why is it not good enough for English traitors?

C. G. G.

ON PAYMENT BY RESULTS.

It seems that recent remarks of mine on the subject of slackers in aircraft and other armament factories have got quite a number of people on the raw—as they were intended to do. There are some people whose consciences only begin to sit up and take notice when they are prodded in a sore spot. The pity is that Press and politicians alike pay so little attention to this interesting psychological fact.

Anyhow, I have received quite a number of letters which indicate that my remarks went home. As a sample, here is one from Bromley, Kent:—

> "As a regular reader of your paper, I write to protest against the article written above the initials C. G. G. So disgusted am I with the general tone of the whole article, and particularly with some of the expressions used, that I have cancelled the order for future delivery from my newsagent.
>
> "Further, all the employees at the firm where I am engaged have pledged themselves never to purchase another copy."

Well, that is something to the good, anyhow. For months we who are responsible for this paper have been trying to cut down the unnecessary circulation, so as to reduce the consumption of paper, yet people have insisted more and more on having the paper, in spite of the price having trebled. It is therefore gratifying to find that some of its obviously useless readers have kindly cut themselves off. By doing so they have conferred a favour on us, and their action will enable a corresponding number of people who have been clamouring for The Aeroplane to receive it in future.

At the same time I am sorry to find that my remarks apply to all the employees at the factory in which my correspondent spends his time—I dare not say "works," for the cap has so obviously fitted him that one is forced to assume that he does little work there. Fortunately other shops are better off, for the majority of the employees in aircraft factories have no reason to be stung by any remarks which I may see fit to make about the particular class of people whom they would gladly see ejected from among them.

The Other View.

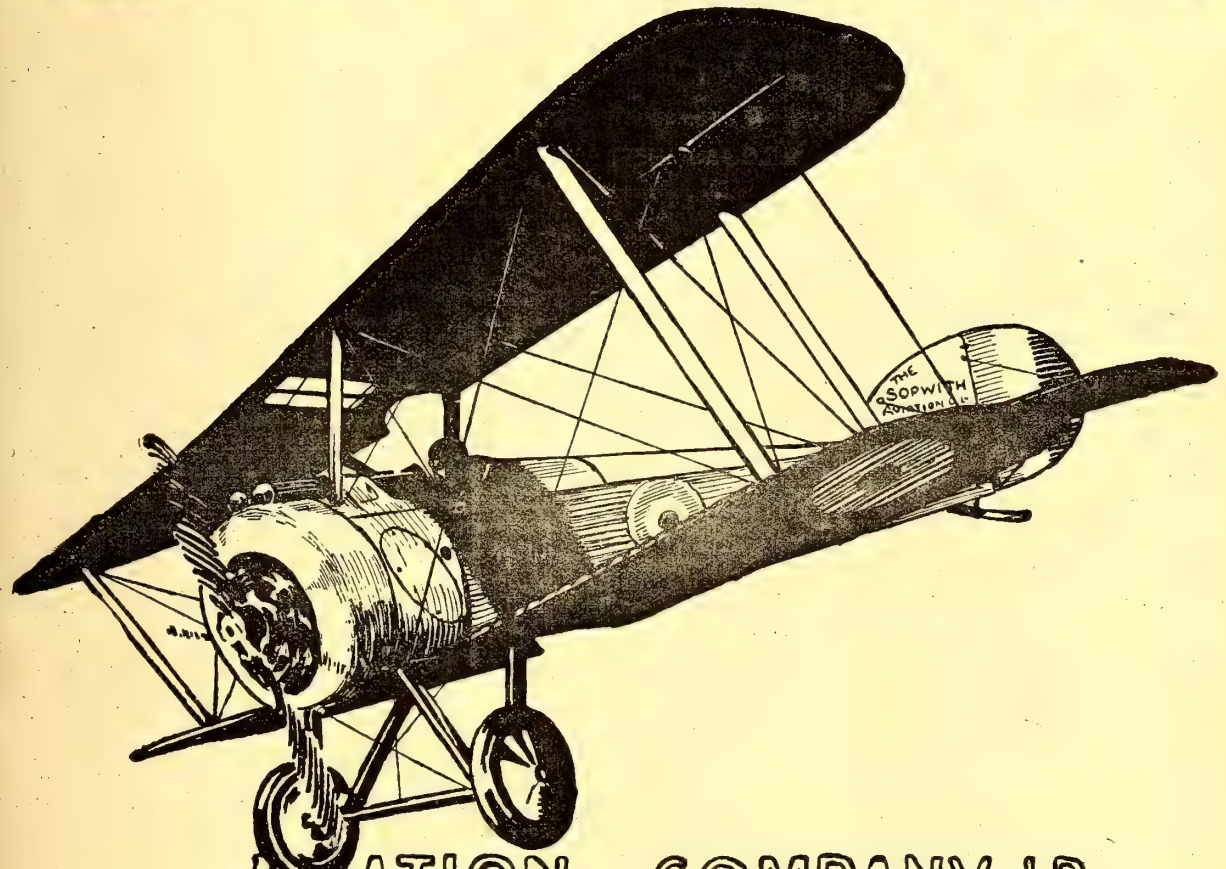
Here is what a workman with a mind thinks on the subject:—

> "Sir,—For a technical journal yours is one of the most human and interesting I have sampled. Your all-round condemnation of the various methods of production is stimulating. As a workman I appreciate the numerous points you make against us, and then I enjoy a quiet smile when I read your conclusion. 'And so we come back at the finish to the fact that it is we ourselves who are to blame.' Then, who are *we*, may I ask? I have realised *that* now for 20 years.
>
> "How long is it since Carlyle, Ruskin, Edward Carpenter, and such men tried to hammer your conclusions into the minds of the 'Captains of Industry.' And, forsooth, you want us to produce. Now, in your extremity, you want production. Can you expect that generations trained and given the example of 'ca' canny' at the top of society can at the word of command become conscientious workers, losing their individual interest in that of the State.
>
> "When 'payment by results' stinks in the nostrils of the trained craftsman after his 12 or 15 years' experience of the P.B.R. system, you neglect to recognise the enormous influence of the Socialist propaganda amongst the most intelligent and thoughtful workmen. Rightly or wrongly, the idea has become imbedded in their consciousness that they have ever been exploited for the selfish indulgence of their so-called betters, and just now they may be pardoned if they find a certain amount of satisfaction at the efforts of our various controllers to cope with the profiteers on all hands, and how helpless such efforts seem to be.
>
> "Perhaps I may be allowed to quote one or two paragraphs from 'England's Ideal,' by Edward Carpenter, written in 1884:—
>
> "'At the bottom, and behind all the elaborations of economic science, theories of social progress, the changing forms of production, and class warfare, lies to-day the fact that the old ideals of society have become corrupt, and that this corruption has resulted in dishonesty of life. . . .
>
> "'The feeling, indeed, seems to be spreading that England stands already on the verge of a dangerous precipice; at any moment, the door may open for her on a crisis more serious than any in her whole history. Rotten at heart and penetrated with falsehood, her aristocracy emasculated of its manhood, her capitalist classes wrapped in selfish luxury and self-satisfied philanthropy, her Government offices effete, plethoric, gorged (in snake-like coma) with red tape, her Church sleeping profoundly, snoring aloud, her trading classes steeped in deception and money-greed, her labourers stupefied with overwork and beer, her poores stupefied with despair, there is not a point which will bear examination, hardly a wheel in the whole machine which will not give way under pressure. The first serious disturbance now, and the wheels will actually cease to go round, the first great strain—European or Eastern war—and it seems not improbable that the governing classes of England will succumb disgracefully.
>
> "'Then, with an exhausting war upon us, our foreign supplies cut off, our own country (which might grow ample food for its present population) systematically laid waste and depopulated by landlord legislation—our position will be easier imagined than described.'

Where Carpenter goes wrong here is that the rural

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population flocked to the towns with the growth of industrialism, in search of higher wages, and no attempt was made by our shopkeeper politicians to make it possible for the farmers to pay wages which would keep labour on the land. That is why the country has become depopulated. Perhaps this trouble may be put right by returned soldiers and proper land laws after this war.

> "The trouble you have to deal with is that the trade and labour organisations are influenced almost wholly by men holding views like these, and although Union officials more or less amenable to Government pressure may make promises as to the conduct of their members, recent experience proves how difficult it is for the officials 'to deliver the goods.' The result is, that instead of being able to appeal to the workers for their whole-hearted and disinterested support '*we*' have to hand over bribes first to one section and then to another. '*We*' commenced with the bankers at the outbreak of war, and it is not to be wondered at that filtering down through the various strata of society it has at last reached rock bottom.
>
> "(Signed) 'A Worker' (boy and man for 40 years).
>
> "P.S.—Do you notice that the Education Bill of Mr. Fisher cannot be proceeded with on account of unforeseen difficulties?"

Edward Carpenter sized up the situation very well, except that he did not understand the aristocracy. Our two great redeeming features in this war have been the magnificent way in which the flower of the youth of the old aristocracy has died, and the way in which the men of the English counties have followed them to death, as the ancestors of each class died together at Crecy and Agincourt, with Marlborough in Germany, and with Wellington in Spain and Belgium.

It is our accursed system of semi-education which has done this country so much harm and has given us a generation of talkers instead of doers. Workers' Councils, Shop Stewards, Trades Union Conferences, and so forth are the chief results. Political graft and shopkeepers' profiteering are secondary results. We happen to be born in an unhappy generation, part-way between an absolutely ignorant period when men followed their aristocratic leaders blindly and faithfully and one in which a fully educated race will make war with a full understanding of the meaning of Patriotism and of the reason for National Discipline.

If we do not reach that stage before the next war, then the Irruption of the Barbarian will be a just punishment and a biological blessing.

The Middle-Aged Man.

Another letter, quite sensible in tone, but displaying that woeful lack of intelligence which is the curse of all classes in this country, reads thus:—

Holmewood Road,
Brixton Hill.

"Sir,—I should be lacking in my duty as a craftsman if I let the article in The Aeroplane, by C. G. G., Oct. 31st, go unanswered. I speak for thousands of fellow-workmen who quite recently have been fighting for a principle which our fathers stood by before us.

"By his insulting reference to the artisan class, C. G. G. shows his ignorance of the type of men of whom he speaks so slightingly. The skilled workmen on whom the greater part of the woodwork construction of an aeroplane falls is a trained and experienced craftsman.

"I say to C. G. G., and I speak with twenty years' experience as a craftsman in the wood-working trade, on shipbuilding fittings and the best house-joinery work, that piecework, in whatever form and whatever way it is introduced, will tend to cause bad and unreliable work, and thus endanger the lives of our intrepid flying men.

"C. G. G. must also remember that thousands and thousands of our fellow craftsmen have joined the Army and Navy, and while they are away fighting yours and our battles, on land and sea and in the air, we pledge ourselves to hold the Trade Union principle and ideal they left with us.

"With these remarks, I enclose copy of Manifesto, and hope C. G. G. will learn from them, as I have learnt from some of his articles, which have been most interesting.—Yours indignantly, W. J. H——."

Now, in the first place I made no insulting references to the artisan class as a whole. I was deliberately insulting to a section of it, and I hope to be still more insulting to that section whenever opportunity offers. I willingly give W. J. H. all the comfort he can extract from his "trained and experienced craftsmen," but I say most emphatically that such men are in the minority. W. J. H. writes with 20 years' experience as a high-class wood-butcher. It is over 20 years since I worked at the bench as a fitter, but I do not fancy the British workman has changed much for the better in the meantime, nor that the wood-butcher is, on the average, of a higher class than the fitter, although his work is cleaner.

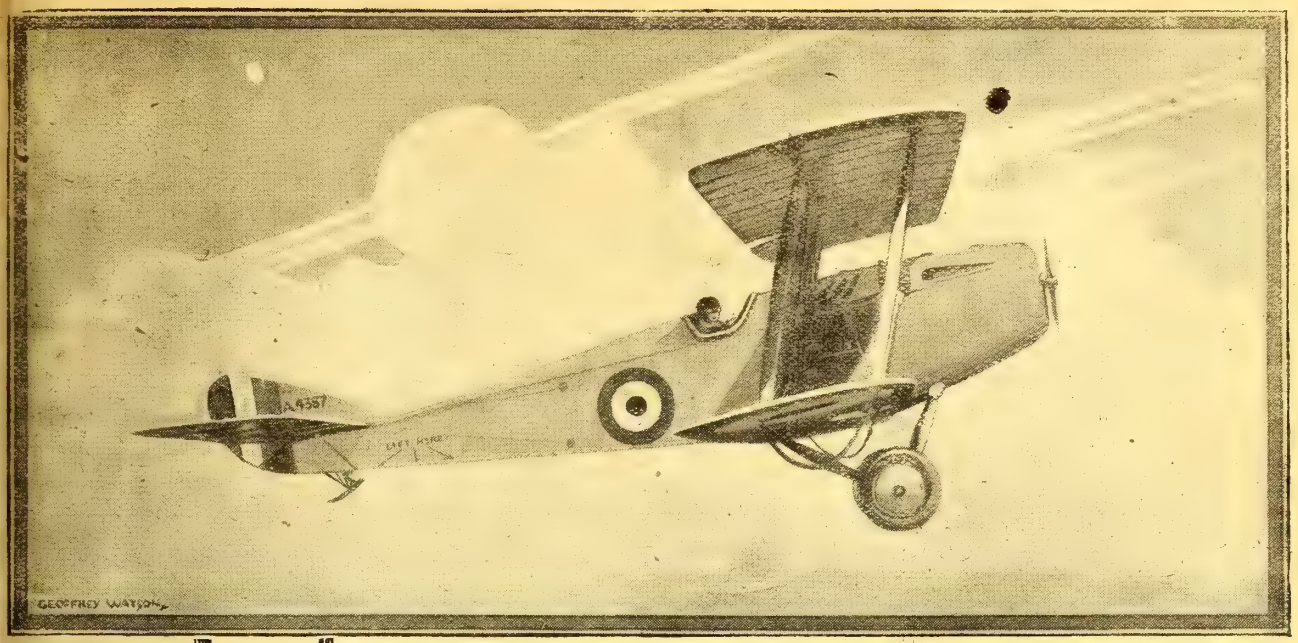
We had our wasters in those days, but most of the older men had served a proper indentured apprenticeship, which made them better workmen than men of the same age twenty years later. I particularly remember one of our tool-shop hands getting bored with an expensive jig on which he was working, and deliberately smashing it, so as to get himself sacked. If he had left of his own accord, he would not have been entitled to draw "out-of-work" pay from his Trade Union, so it paid him better to destroy many pounds' worth of his employers' material and have a little holiday at the Union's expense. There you have an example of the loyalty of a certain class of man to his friends. And, mark you, that man was, when he chose, a really fine mechanic; not the sort of tinker one finds posing as a mechanic in these days.

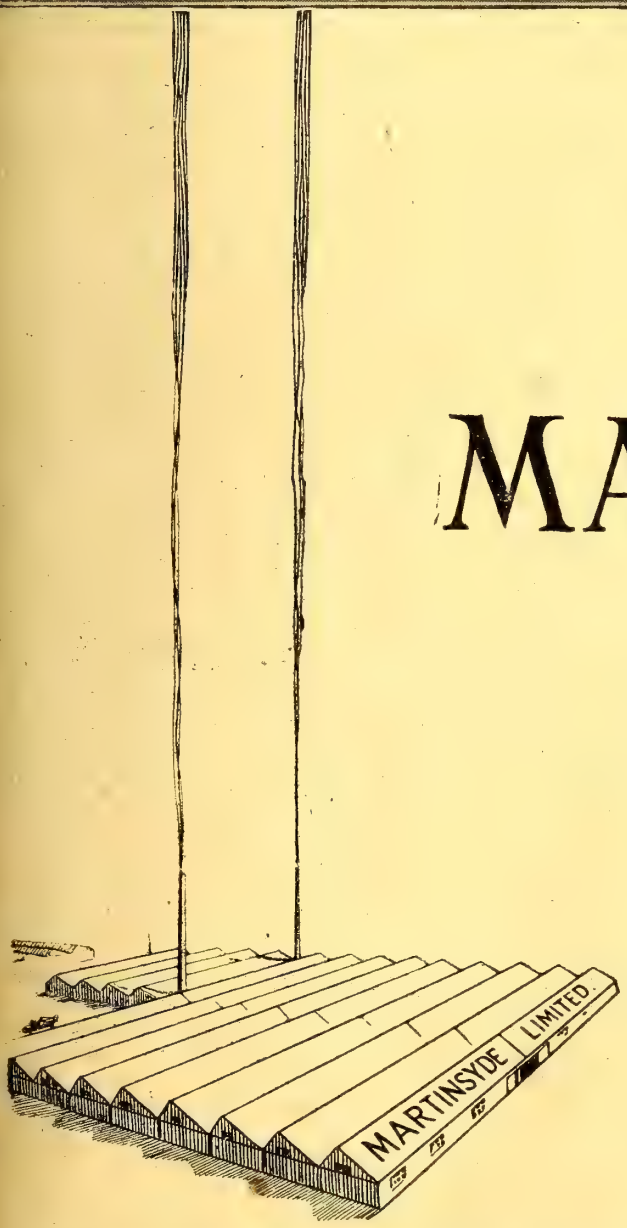
Class Distinction.

I also remember that there was as much snobbishness, or class distinction, amounting almost to class hatred, among the workers as ever there was in relation to those outside. The tool-shop looked down on the machine-shop, and no self-respecting machine-hand would be seen in the same bar with a man from the grinding and polishing shop. Even the foreman of the polishing shop felt a glow of pride if invited to take a drink with a tool-maker. Which has always been a source of joy to me when I have heard the young intellectuals of to-day vapouring about the abolition of class barriers and the usual claptrap about liberty, equality, and fraternity.

It would be interesting to learn from W. J. H. whether things are very different among the wood-working fraternity. Does not the high-class cabinet-maker regard with pitying scorn the mere saw-mill operator. And if the saw-mill hand, by working assiduously in his spare time, became an artist in cabinet-making, would not the Cabinet-Makers' Union, or whatever it calls itself, refuse to accept him as a member of its highly exclusive membership? If so, the Cabinet-Makers' Union is very different from most other Unions, for one of the basic principles of Trade Unionism seems to be Class Distinction, as clearly defined as is the caste system in India.

The mere labourer or helper seems to be condemned to remain for ever in an inferior caste. He may have a Union of his own, but he cannot join the upper classes in his own trade by merely paying for his promotion in hard cash. Wherein it would appear that the snobbishness or exclusiveness of the Upper Class Trade Union is greater than that of the ordinary Social Classes, seeing that we were told only a week or so ago that anyone could have himself removed from the lower Political Trade Union in the House of Commons to the higher one in the House of Lords by merely paying for it, and without professing any higher qualification.





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THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

The Great Manifesto.

Now we come to the manifesto to which W. J. H. refers. This reads as follows :—

MANIFESTO
OF THE
London District Aircraft Woodworkers' Council.

WE, the Woodworking Operatives in the Aircraft Industry, desire to make public knowledge of the facts concerning the dispute which has arisen between us and the employers.

At the instigation of the Ministry of Munitions a ballot vote was taken of the whole of the members of the various societies on the question of a departure from our principles and traditions, viz. : "the introduction of a system of payment by results."

By an overwhelming majority the woodworkers have **decided against this policy**.

This result, which was naturally expected by the woodworkers to be a basis of settlement, has been totally ignored, and the Ministry of Munitions have informed our National Officials that they are in sympathy with the system of payment by results, and will not prevent employers from introducing this system.

It is, therefore, apparent that instead of the Ministry of Munitions assisting the woodworkers and the employers to come to an amicable agreement they have provoked the woodworkers into adopting the "down tools" policy by taking sides with the employers.

Now we feel that this pernicious system, which will inevitably result in scamped and shoddy workmanship, should not be introduced into the manufacture of Aircraft.

The lives of our Airmen are far too valuable to be exposed to such risk.

As to the Ministry of Munitions charge of slackness of production, we answer that the principal causes are :—

1. Allowing contracts for obsolete machines to be completed and then dismantled.
2. Inefficient Inspectors in the Aircraft Inspection Department.
3. Shortage of materials.
4. Shortage of woodworking machinery.
5. Bad management.

Our sole aim and object is an ideal, and that is the total abolition of any system of payment by results.

A meeting between the employers and our officials was arranged at Caxton Hall, Westminster, at 3 p.m., on Friday, Oct. 26th.

Our officials attended at the place and time appointed, and after keeping them waiting for over one hour the following resolution was handed to them :—

> "That the employers are prepared to agree to a standard minimum rate (inclusive of war wages) in relation to the rise in the cost of living, such rate and rise to be determined by the Government on the understanding that the Unions agree to a system of payment by result in conjunction therewith."

To come to this conclusion without first conferring with our officials, and to keep them waiting for over an hour, was, in our opinion, a studied and predetermined insult, and we do most bitterly and intensely resent this treatment of our officials.

The Ministry of Munitions and the Employers have had ample opportunity of settling this matter, and have lamentably failed.

We, therefore, have taken the only action possible and have ceased work, and we are determined not to resume until a settlement has been arrived at.

Citizens of London, remember that your lives and property are at stake!

Our strongest defence is more Aeroplanes and still more Aeroplanes!

Do your utmost to assist the Ministry of Munitions to wipe off the charges we put up against them in answer to their charge of slackness of production.

Do your utmost to assist us to retain our ideal, and we will pledge ourselves to "deliver the goods."

Secretary: A. W. THORN, 36, Sutherland Street, S.W.1.

No date is shown on the manifesto, so I cannot say when the threatened strike took place, if it took place at all. But the manifesto is a priceless example of that extraordinary mixture of stupidity and hypocrisy which is at once the curse and the blessing of this country.

It is a blessing because our stupidity prevents us from knowing when we are beaten, and so enables us to keep going a shade longer than the other fellow, and our hypocrisy enables us to do with a clear conscience all sorts of profitable things which, if done by anyone else, we should characterise as "dirty business"—like stealing land from niggers on the plea of Christianising them.

Payment by Results.

The outcry against "Payment by Results" is an example of stupidity in excelsis. What man is paid otherwise than by results? When a member of "The London District Aircraft Woodworkers' Council" buys a quart of beer (very bad beer, I fear) instead of a pint, and pays twice as much for it, is he paying by results or not?

If I want a four-pound loaf instead of a two-pound loaf, have I any right to say to the baker, "Look here, I'm bigger than the chap next door, so I want a bigger loaf, but I'm not going to pay you by results. I'm only going to pay the same price for my loaf as the other chap pays!"?

Or supposing a working cobbler can sole two pairs of boots while the cobbler down the street is soling one pair, is he only to charge half as much per pair to his customers as the other man charges, so that each of them earns the same money in the day? Or is he to be paid by results, by charging the same price per pair and making twice as much money in the day?

If a man is not paid by results, why should he do any work at all? If he is not paid by results, it seems that he is to be paid without results, so he may just as well stand round and do nothing and draw his pay—which is what happens in a good many cases. If men are not to be paid by results, it means setting the pace of the shop to the pace of the worst worker in it.

Sweated Labour.

If there is a flat rate per hour throughout the shop, and the worst worker produces a certain piece of an aeroplane in that time, it means that a first-class man who can produce three of those pieces in an hour is only being paid one-third as much for his work. Which is not only absurd, from the point of view of the first-class workman, but is the very worst form of sweating. It means that the good willing worker is being sweated by the slacker or the incompetent, or rather that he is being sweated by his Union for the benefit of the waster.

The only alternative for the good worker is to slow down to the speed of the waster, unless he is such a whole-souled patriot as to be willing to work for a third of the rate of pay received by the waster. I fancy, however, that few such patriots exist. It seems, therefore, that if Payment by Results is to be barred, it means that the wasters are to be over-paid out of a system of Robbery by Results at the expense of the better-class workers.

To crush this form of sweating it seems as if it would be worth while to form a kind of Super-Trade Union, to be known as the Willing Workers' Union, composed entirely of skilled and rapid workers drawing extra high rates of pay in return for extra high rates of output. There are a good many shops wherein the members of such a Union could draw enormous wages out of a system of Payment by Results.

The Life-Saving Hypocrisy.

The pure hypocrisy of the claim that Payment by Results "will inevitably result in scamped and shoddy workmanship" and that "the lives of our Airmen are far too valuable to be exposed to such risk" is enough to make one physically sick.



From a painting by Mr. SANDFORD PITT.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

There are certain things about aeroplanes which cannot be done on the Payment-by-Results—or "piece-work"—system. For instance, one cannot tune up an engine or true up an aeroplane by piece-work. But the bulk of the work can and should be done piece-work, especially in the roughing-out stages. Spars can be machined, longerons can be machined, propellers can be carved, struts can be shaped, ribs can be made, wiring-plates can be stamped, bolts can be turned, and any quantity of other things can be done piece-work.

If they are so produced, there is not the remotest chance of their exposing anybody to any risk. The piece-worker does not select the material in any case. If his or her work does not pass the gauges or measurements imposed by the Inspection Department, it is rejected. Defects cannot be hidden. Either the stuff is up to size or it is not, and there is an end to it.

The Real Objection.

If it does not pass inspection, the worker does not get paid for it. That is one of the gravest objections from the Union point of view. Also, the clever, energetic worker may make three or four times as much money as the slacker or incompetent, and so become a bloated plutocrat, or a sanguinary capitalist. That is another very grave objection.

Also, the lazy man, finding so hot a pace set by the best workmen, may be forced to bestir himself and actually perspire over his work, which may lead to his catching a chill when his fit of energy is past. And that is another grave objection.

But the greatest objection of all is pure class jealousy. The jealousy of the lazy man, the incompetent, the chronic malcontent, the crazy anarchist, for the good class, self-respecting, honest, skilful, patriotic workman who is anxious to do his best for his country, and has no conscientious objection to being paid in proportion to the work he does.

A Case in Point.

And what happens when wages are raised without insistence on payment by results? In one factory which I happen to know rather well, the men approached the Government with a demand for more wages. The demand was granted as a matter of course. The immediate result was a drop in output corresponding to the rise in wages.

The men were already getting all the money they could conveniently spend, so as soon as their wages were raised they immediately began losing quarters and taking half-days off, because they could thus draw the same money per week as before, and work less hours for it. Consequently the firm's wage bill per week did not increase, but its output decreased, and the Government got less aeroplanes. What have our patriotic Woodworkers' Council to say about this method of producing "more Aeroplanes and still more Aeroplanes"?

The Causes of Slackness.

The five causes of slackness alleged by the Woodworkers' Council are all justifiable excuses for shortage of output. They have all been set forth over and over again in this paper as contributory causes of shortage. But does this association of wood-butchers seriously expect anyone in their senses to believe that they hope to abolish all these evils and increase the quality and quantity of aeroplanes by "downing tools" at the most critical moment of the war.

What do they imagine would have happened if Mr. Thomas Atkins had "downed tools" in his trenches in 1915 or thereabouts because of (1) obsolete methods of attack being in use and attacks being abandoned at great cost of men, (2) inefficient Staff Officers issuing operation orders, (3) shortage of shells and ammunition, (4) shortage of heavy guns, tanks, and aeroplanes, (5) bad generalship?

Compare those five perfectly good reasons with the wood-butchers' reasons for downing tools, and they will be found to be exact parallels. If Mr. Atkins had downed tools then, the Woodworkers' Council would have found themselves by now working ten hours a day at the bench under the surveillance of a German sentry set over them to see that they worked and did not talk. That would have been the highly effective German method of seeing that England paid the war-indemnity imposed on her, and made a nice profit for Germany out of the war. And I am not sure that it would not have been a very edifying spiritual experience for the said "Council."

Unfortunately the "Council" has omitted the sixth cause of aeroplane shortage, slackness among the men. That happily does not find its parallel in the military list of grievances, for our wonderful volunteer Army of 1914-15 did not contain the admixture of slackers, malcontents, trench-dodgers, and conscientious objectors which our workshops contain, thanks to our not adopting conscription immediately war began.

The Woodworkers' Comic Cuts.

Far the most humorous thing that has happened for a long time is the propinquity in the Manifesto of those two delightful sentences:—

"We, therefore, have taken the only action possible and have ceased work."

"Our strongest defence is more Aeroplanes and still more Aeroplanes."

Just imagine the Army issuing a manifesto saying, "We will fight no more; the existence of our homes and families depends on more and more soldiers," and you get some idea not only of the muddle-headedness of this precious Woodworkers' Council, but of the astounding, the almost imbecile, gullibility of the men who act under their orders and down tools when told.

The pledge to "deliver the goods" if they are allowed to retain their ideal—which, be it remembered, is Non-Payment by Results—would be truly touching if it were not so utterly funny.

Suppose a really strong Government arose and took them at their word. They would all be pushed into the Army. They would all get a shilling a day and their grub. They would all live in camps round the factories in which they worked. They would only be allowed leave once a year for three days at a time. Their families would live on separation allowances. And they would thus attain their ideal of Results without Payment.

C. G. G.

WITH MILITARY HONOURS.

The Secretary of the War Office announces that when the relatives of civilians killed in enemy air raids so desire, arrangements may be made for the attendance of troops, with a band if one is available, at the funeral, and for the loan of a Union Jack to cover the coffin. Applications in such cases should be addressed to General Headquarters, Home Forces, Horse Guards, S.W.1, but it will be understood that sanction can only be given if troops are available locally, and if military exigences permit of it.

[This is quite one of the wisest things the authorities have done since the outbreak of war. In the first place it recognises once and for all that there are no more civilians, in the sense of non-combatants. All are now recognised as taking their part in the war. In the second place, it is calculated to bring the non-military section of the community more closely in touch with the Army, which is the mainstay of the Empire to-day. One sees in this simple action a step towards that great ideal set forth many years ago by Mr. Kipling in "The Army of a Dream." The present arrangement recalls how in that story people kept their corpses till Saturday so that they should be "played through by the Guards."—Ed.]

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THE AIR FORCE BILL IN THE HOUSE OF LORDS.

The following report of the final stages of the Air Force Bill in the House of Lords is taken, with acknowledgments, from the "Times" newspaper:—

On Nov. 27th **Earl Curzon,** in moving the suspension of the Standing Orders with a view to the consideration of the Air Force Bill being completed at this sitting, reminded their Lordships that since they agreed to the second reading of the Air Force Bill last week Lord Rothermere (who had taken his place on the front bench) had been appointed Air Minister, and said he was expressing the feeling of all their Lordships when he wished his noble friend every success in the extremely onerous and responsible duties which he had undertaken. One of the first of those duties would be the selection of the members of the Air Council to be established by the Bill, and it was essential that that step should be taken without delay.

The Standing Orders having been suspended,

Lord Sydenham, speaking on the motion to go into Committee, welcomed the foundation of the Air Force as a distinct arm of the Service, and said he wished that step had been taken earlier. The extreme importance of the Air Service was being demonstrated every day, and it seemed not too much to say that the most efficient air force might win the war.

The Germans were making every effort, not merely to meet the danger which they foresaw against them in the air, but to develop their air raids upon London, which they foolishly imagined would weaken our determination, and hamper us in the war.

If ever the inner history of our handling of the Air Force came to be written, he feared it would make melancholy reading. **The Earl of Crawford,** in moving the second reading of the Bill, had admitted that there had been waste of material and a want of concentration in effort. Hitherto the Air Board had suffered owing to a lack of sufficient powers, and it had never been a properly organised body. Considering its limitations and disabilities, it had done wonderful work, for which the country ought to be grateful to Lord Cowdray.

The divorce of the design from the manufacture of aircraft had been a mistake. The Air Board in 1916 was actually compelled to plead with the Ministry of Munitions for priority of supply in respect of a quantity of material. Since then the Ministry of Munitions had evidently been awakened to the needs of the Air Service, and the speed of manufacture had been very much increased. That was a national gain.

The Bill was remarkable in respect of the number of matters referred to in it which it left to be settled by Order in Council. He asked whether in the future the whole responsibility for the design and manufacture of aircraft of all kinds would rest entirely with the Air Council; whether all aeronautical inventions, experiments, and research, and the armament of all aircraft would centre in that Council; and whether the whole of the training of the Air Force, the provision of aerodromes, and all anti-aircraft forces would be brought under the control of the Air Council.

The Bill said nothing as to the kind of Council which was contemplated. The Air Ministry would require a most capable General Staff and a first-class Inventions Department, and it must keep in close touch with the General Staffs of the War Office and the Admiralty. He was convinced that the creation of a separate Air Service had become a necessity, and he wished the Bill had provided for the linking up of the Air Services of the Dominions in the future.

[Compare this last paragraph with Mr. Billing's suggestion that there should be Naval and Military members on the Air Council, and that the Air Force should be Imperial.—Ed.]

The **Earl of Crawford** said he could not give many of the details Lord Sydenham had asked for because of the decision of the authorities that no cut-and-dried scheme should be placed on the Statute-book at this early stage in the history of the Force. It was not to be tied down to something which in practice might prove inconvenient and could not be changed without coming to Parliament for an amending Act. Orders in Council provided a certain amount of elasticity, and that was the ground on which the Bill presented an outline rather than a completed canvas.

The broad idea was that the Air Council would have powers with regard to the Air Service corresponding with those of the Army Council in respect of the land military service and the Admiralty in respect of the naval service. The Secretary of State would correspond in rank with the Secretary of State for War and the First Lord of the Admiralty, and members of the Council would be allotted specialised functions.

The responsibility for all designs and the correct execution would rest with the Air Minister; but the actual work would be supervised and carried out by the Minister of Munitions. The Air Ministry would have its own finance and estimates, but the Munitions Department, as the manufacturing branch, would carry some of the expenditure. In course of time the Air Service, so far as finance was concerned, would occupy the same position as the Army and Navy.

Viscount Haldane said that the Army Act had no effect except as it was kept alive by an annual enactment, and he was glad to see that the same constitutional principle was observed in the Air Force Bill.

The motion was agreed to, and the House went into Committee, the Earl of Kintore in the Chair.

The **Earl of Crawford** moved to insert the following paragraph in the first schedule of the Bill:—"Provided that under regulations made by the Army Council and Air Council the officers and airmen of a body of the Air Force acting with any body of His Majesty's military forces on active service, or any of such officers or airmen, may, in such manner and in such circumstances, and subject to such conditions as may be provided by or under those regulations, be made subject to military law, and in such case they shall be subject thereto in like manner as if they were officers and airmen attached to the Army." This was, he explained, a provision analogous to that under which soldiers while on board ship were brought within the scope of the Navy Discipline Act.

The amendment was agreed to, as was also another amendment to insert in the second schedule a provision "that under regulations made by Air Council and Army Council, the officers and soldiers of a body of His Majesty's military forces acting with any body of the Air Force on active service, or any of such officers or soldiers, may, in such manner and in such circumstances and subject to such conditions as may be provided by or under those regulations, be made subject to this Act, and in such case they shall be subject thereto in like manner as if they were officers and soldiers attached to the Air Force."

The Bill, as amended, was reported to the House and was immediately read a third time and passed.

* * *

On Nov. 28th in the House of Lords, the Royal Assent was given by Commission to the Parliament and Local Election (No. 2) Act and the Air Force Constitution Act. The Lords Commissioners were the Lord Chancellor, the Earl of Kintore, and Viscount Farquhar. There was no other business, and the House rose at 5 o'clock.

THE CIVIL AERIAL TRANSPORT COMMITTEE.

On Dec. 3rd, in reply to **Mr. Pemberton-Billing,** who asked the **Prime Minister** if he had received a report as to the progress and recommendations, if any, of the Civil Aerial Transport Committee; if he would say how many sittings the Committee had held within the last six months; whether any changes had been made in its personnel during this period; what is the annual cost to the State of the Committee, including salaries, rent, rates, taxes, printing, posting, and stationery; and whether the Committee is to be continued, **Mr. Bonar Law** states:—

No report has yet been received from this Committee, but I understand that its report may be hoped for in the early part of next year. The Civil Aerial Transport Committee itself held two meetings immediately after its formation, when it was decided to divide the subjects of inquiry into five different branches to be considered by five sub-committees, which have held altogether 31 meetings. Some of these sub-committees have sent in reports to the Parliamentary Secretary to the Air Board, who is acting chairman of the main Committee, and the others are expected to do so shortly.

During the last six months Lord Northcliffe, who was originally chairman, Major-General Brancker, Lord Montagu of Beaulieu, Mr. Claude Johnson, and Mr. Tyson Wilson have left the Committee in consequence of other duties, while Sir G. Perley, Major-General McCay, and Sir Mackenzie Chalmers have been added to the main Committee to represent the Dominion of Canada, the Commonwealth of Australia, and the Home Office respectively. Sir E. Morris, the Prime Minister of Newfoundland, is also joining the Committee. In addition, a number of gentlemen with special knowledge of the particular subjects of inquiry have been co-opted on the various sub-committees. Their names are as follows:—

Mr. Butler Aspinall, K.C.
Major the Rt. Hon. H. T. Baker.
Mr. L. Bairstow, F.R.S.
Captain F. S. Barnwell.
Mr. R. O Cary.
Mr. A. E. Chorlton.
Mr. W. Barnard Faraday.
Sir R. T. Glazebrook.
Wing Captain Groves, R.N.
Mr. Nevile Gwynne.
Sir Frank Heath.
Major H. Lyons, F.R.S.
Mr. Arthur Morley.
Professor J. E. Petavel, F.R.S.
Mr. F. Pick.
Captain E. Elvey Robb.
Squadron Commander the Master of Sempill, R.N.
Major Vincent Smith, M.C.
Major G. I. Taylor.
Mr. A. E. Turner.
Mr. H. J. Wilson.

The direct cost of the Committee, apart from services rendered to it by other Departments, such as the Stationery Office, and some trifling payments for travelling expenses, is at the rate of £600 per annum, being the amount of the salaries paid to the assistant secretaries.

It is proposed to continue the Committee in existence till it has presented its report.

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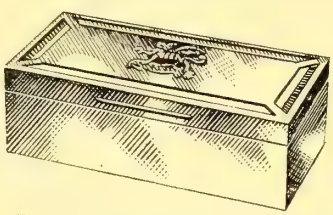
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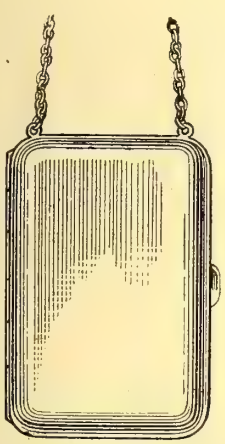
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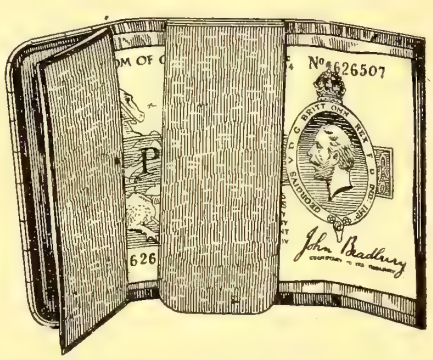
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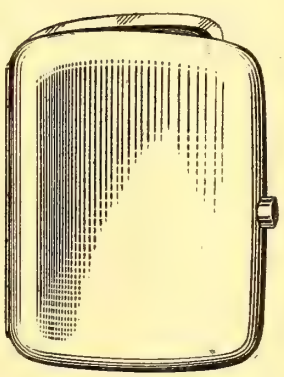
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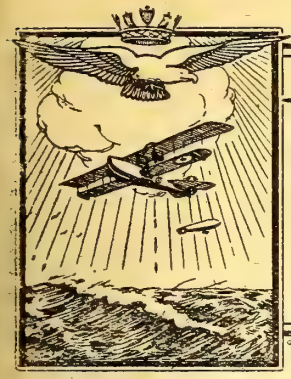
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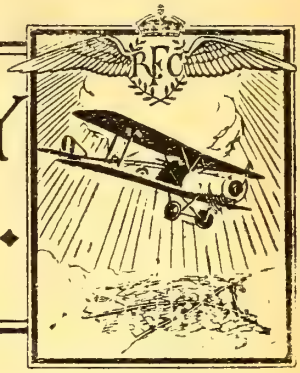
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NAVAL and MILITARY AERONAUTICS



FROM THE "LONDON GAZETTE."

Admiralty, Nov. 17th.

R.N.A.S.—Nov. 23rd. Obsr. Lt. to be Sqdn. Obsr.—G. S. Trewin, June 30th.

To be temp. Obsr, Lt., Aug. 18th, 1914, and temp. Sqdn Obsr., June 20th :—Erskine Childers.

To be temp. Obsr. Lt., March 20th, 1915, and temp. Sqdn Obsr., June 30th :—F. H. Swann.

To be temp. Obsr. Lt., May 9, 1915, and temp. Flt. Obsr., June 30th, 1916 :—Lord Torrington.

To be temp. Obsr. Lt., June 26, 1915, and temp. Flt. Obsr., Dec. 31st, 1916 :—W. B. L. Jones.

Lt. R.N.V.R., to be temp. Obsr. It. :—W. L. Samson (March 31st, 1915.

War Office, Nov. 27th.

REGULAR FORCES.—Establishments.—R.F.C.—Mil. Wing. —Wing Comdr.—Capt. (temp. Maj.) S. Grant-Dalton, D.S.O., York. R., from a Sqdn. Comdr., and to be temp. Lt.-Col. whilst so empld. (Nov. 1st).

Asst. Instrs. in Gunnery.—Graded as Equipment Officers, 3rd Cl. ——Temp. Sec. Lt. P. L. Smith, Gen. List, from a Flying Officer (Sept. 23rd); Sec. Lt. C. B. Harris, Suff. R., T.F., and to be secd. (Nov. 10th).

Schools of Instrn.—Schools of Mil. Aeronautics.—Instr.—Graded as an Equipment Officer, 1st Cl.—Temp. Lt. P. P. Capelli, Gen. List, an Equipment Officer, 2nd Cl., and to be temp. Capt. whilst so empld. (Oct. 1st).

Asst. Instrs.—Graded as Equipment Officers, 2nd Cl.—Temp. Sec. Lt. R. Leake, Gen. List, an Equipment Officer, 3rd Cl., and to be temp. Lt. whilst so empld., July 6th; Temp. Lt. H. J. L. Cappel, Gen. List, a Flying Officer (Observer), Aug. 16th; Lt. A. Hollingworth, Canadian Local Forces, a Flying Officer (Observer), Aug. 29th; Capt. H. C. Waghorn, Lond. R., T.F., a Flying Officer (Observer); Lt. G. Curgenven, Yeo., T.F., a Flying Officer (Observer); Sec. Lt. W. G. Duffield, Spec. Res., an Equipment Officer, 3rd Cl., and to be temp. Lt. whilst so empld., Oct. 1st; Graded as an Equipment Officer, 3rd Cl.—Sec. Lt. (temp. Lt.) F. H. L. Varcoe, M.C., Middx. R., T.F., a Flying Officer (Observer), June 30th.

Gen. List.—Temp. Capt. E. L. Chute relinquishes his commn. on account of ill-health contracted on active service, and granted the hon. rank of Capt. (Nov. 28th).

War Office, Nov. 28th.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing. —Sqdn. Comdr.—The initials of Sec. Lt. (temp. Maj.) J. T. Whittaker, M.C., A.S.C., are as now described, and not as in the "Gazette" of Oct. 4th.

Gen. List.—The undermentioned to be temp. Sec. Lt.: Sjt. George Bainbridge, from R.F.C., Nov. 12th, 1917.

* * *

A dispatch, dated Oct. 25th, 1917, has been received from Lt.-Gen. G. F. Milne, C.B., D.S.O., Commanding-in-Chief, British Salonika force, in which the following officers, N.C.O.'s and men are mentioned for gallant conduct and distinguished services rendered during the past six months.

Royal Naval Air Service.

Boynton, Flt. Lt. E. S.; Bradley, Flt. Lt. E. T.; Hicks, Flt. Lt. E. P.; Magor, Flt. Lt. G. A.; Moore, Flt. Lt. G.; Richardson, Flt. Sub-Lt. W. H.; Scarlett, Capt. F. R., R.N. (Wing Capt., R.N.A.S.); Smyth Pigot, Wing Comdr. J. R. W., D.S.O.

Royal Flying Corps.

Bamford, temp. Lt. J. L., Gen. List (killed); Bell, Lt. (temp. Capt.) W. D. M., M.C., Spec. Res.; Easdale, Lt. D., Spec. Res.; Edmunds, Lt. P. M. L., Lrs.; Gibson, Lt. H. J., Spec. Res.; Goulding, Lt. A. G., M.C., Can. Infy.; Green, temp. Lt. (temp. Capt.) G. W. M., D.S.O., M.C., Gen. List; Herring, Lt. (temp. Maj.) J. H., D.S.O., M.C., Spec. Res.; Knight, Lt. A., N. Lan. R.; McBain, Lt. (temp. Capt.) W. R. B., R.F.A.; McLean, Lt. (temp. Capt.) J. Y., R.F.C.; Meller, temp. Sec. Lt. (temp. Capt.) S. A., Gen. List; Minchin, Lt. (temp. Maj.) F. F., M.C., Spec. Res.; Preston, Capt. O. I., Notts and Derby R.; Scales, temp. Lt. H. J., Gen. List; Songhurst, Lt. (temp. Capt.) F. H., Spec. Res.; Sutherland, temp. Sec. Lt. (temp. Lt.) W., Gen. List; Wynne-Eyton, temp. Lt. R. M., Gen. List; Airey, No. 5755 Flt. Sjt. J. W.; Andrews, No. 7876 1st Cl. Air Mech. W. H. S.; Frith, No. 36764 Cpl. H.; Holding, No. 2371 Sjt. W. C.; Lovelace, No. 2468 Sjt. F.; Ward, No. 25268 Cpl. J. A.; Young, No. 25407 Cpl. J. L.

War Office, Nov. 29th.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing. —Flt. Comdrs.—From Flying Officers :—Capt. J. S. G. Collie, R.F.A., T.F., Nov. 15th. To be temp. Capts. while so empld. :—Temp. Lt. R. A. Walmisley, Gen. List; Temp. Sec. Lt. (temp. Lt.) J. A. Barton, Gen. List; Sec. Lt. (temp. Lt.) E. P. Roberts, M.C., R. Suss. Regt.; Sec. Lt (temp. Lt.) D. W. Forshaw, S. Wales Bord., T.F.; Lt. C. E. S. Russell, Spec. Res.; Temp. Lt. J. V. Aspinall, Gen. List; Sec. Lt. D. S. Kennedy, M.C., Spec. Res.; Lt. W. G. Cope, York Regt., Spec. Res.; Lt. S. G. Rome, M.C., Arg. and Suth'd Highrs.; Sec. Lt. (temp. Lt.) J. B. E. Crosbie, Worc. Regt.; Sec. Lt. (temp. Lt.) F. A. Coward, R.W. Surr. R.; Sec. Lt. (temp. Lt.) C. R. Steele, York Regt.; Sec. Lt. (temp. Lt.) F. P. Scott, Yeo., T.F.; Sec. Lt. (temp. Lt.) J. B. F. Austin, Hrs.; Lt. W. Roche-Kelly, Spec. Res.

Asst. Instrs. in Gunnery.—(Graded as Equipment Officers, 3rd Cl.)—Lt. T. W. L. Dickson, Spec. Res., from a Flying Officer; Temp. Sec. Lt. R. C. Doughty, Gen. List, from a Flying Officer (Observer); Temp. Sec. Lt. (on prob.) C. G. Stevens, Gen. List, and to be confirmed in his rank, Nov. 3rd.

Memorandum.—Herbert Leslie Lucking to be temp. Hon. Lt. whilst empld. as Asst. Inspr. Aeronautical Inspn. Dept, August 1st, 1917.

Admiralty, Nov. 30th.

The King has been pleased to approve of the award of the following Decorations and Medals to Officers and Men for services in action with enemy submarines :—

Bar to the Distinguished Service Cross.

Flt. Lt. B. D. Hobbs, D.S.O., D.S.C., R.N.A.S.

Second Bar to the Distinguished Service Cross.

Flt. Sub-Lt. (now Flt. Lt.) F. L. Dickey, D.S.C., R.N.A.S.

Distinguished Service Medal.

Air Mech., 1st Gr., J. A. Mortimer, O.N. F11344.
Air Mech., 2nd Gr., E. M. Nicol, O.N. F18942.

* * *

The King has been pleased to approve of the award of the following honours and decorations to Officers of the Royal Naval Air Service :—

Distinguished Service Order.

Wing Comdr. C. Ll. Courtney, R.N.A.S.

In recognition of his services in command of a wing of the Royal Naval Air Service at Dunkirk. Squadrons attached to his wing have invariably shown a high standard of efficiency, and the success of the fighting squadrons generally is largely due to his knowledge and initiative.

Obs. Lt. R. W. Gow, D.S.C., R.N.A.S.

For conspicuous gallantry and devotion to duty in carrying out a photographic reconnaissance of the Belgian coast under difficult conditions on Oct. 15th, 1917. Obs. Lt. Gow has also carried out a large amount of valuable spotting work for H.M. monitors, both by day and night, including the successful operations against Zeebrugge on May 12th, 1917, and against Ostend on June 5th, 1917.

Distinguished Service Cross.

Act. Flt. Comdr. F. C. Armstrong, R.N.A.S.

In recognition of his services with a wing of tthe R.N.A.S. at Dunkirk between February and September, 1917. He has destroyed several hostile machines, and has led his flight with very great skill and gallantry.

Flt. Lt. H. F. Beamish, R.N.A.S.

In recognition of his services with a wing of the R.N.A.S. at Dunkirk between January and September, 1917, during

which time he has destroyed several hostile machines and driven down numerous others.

Flt. Sub-Lt. (now Flt. Lt.) E. T. Hayne, R.N.A.S.

In recognition of his services with a wing of the R.N.A.S. at Dunkirk between March and September, 1917. He has had numerous engagements with enemy aircraft, and on Aug. 16th, 1917, attacked an enemy aerodrome and placed a whole flight of machines out of action by machine-gun fire. During a flight of over two hours, during which time he attacked transport and railways, he never exceeded a height of 1,000 ft.

Flt. Sub-Lt. G. W. Hemming, R.N.A.S.

In recognition of his services with a wing of the R.N.A.S. at Dunkirk between March and September, 1917, during which period he has been continuously employed on the Belgian coast, and on many occasions has been in charge of a flight. On Sept. 22nd, 1917, he led his flight against a formation of 20 enemy aircraft, and, engaging three consecutively, brought them all down.

Flt. Sub-Lt. J. E. L. Hunter, R.N.A.S.

In recognition of his services with a wing of the R.N.A.S. at Dunkirk between July and September, 1917, during which time he has carried out continuous work on offensive patrols. On Sept. 22nd, 1917, he destroyed two enemy aircraft which were attempting to interfere with our spotting machines.

BAR TO THE DISTINGUISHED SERVICE CROSS.

Act. Flt. Comdr. R. P. Minifie, D.S.C., R.N.A.S.

For conspicuous gallantry in air fighting throughout October, 1917, during which period he has destroyed several enemy machines and driven down others out of control.

* * *

The following Officer has been mentioned in dispatches :—

Lt. H. O. Fry, R.N.V.R.

CORRECTIONS.

In "Gazette" of Nov. 2nd, 1917, for Obsr. Sub-Lt. Paul Brewsher, R.N.A.S., read Obsr. Sub-Lt. Paul Bewsher, R.N.A.S.

WAR OFFICE, Nov. 30th.

REGULAR FORCES—ESTABLISHMENTS.—R.F.C.—MIL. WING.—Asst. Dir. of Aviation.—Maj. N. D. K. MacEwen, D.S.O., Arg. and Suth'd Highrs., and to be temp. Lt.-Col. whilst so empld., vice Capt. P. W. L. Broke-Smith, R.E., Aug. 6th, 1916 (substituted for the notification in the "Gazette" of Sept. 5th, 1916).

Sqdn. Comdrs.—From Flt. Comdrs., and to be temp. Majs. whilst so empld. :—Temp. Capt. W. J. Y. Guilfoyle, M.C., Gen. List, Aug. 11th. Temp. Capt. L. F. Forbes, M.C., Gen. List, Sept. 21st. Temp. Capt. F. J. Roberts, Gen. List, Oct. 20th. Sec. Lt. (temp. Capt.) J. C. Callaghan, M.C., R. Muns. Fus., and to be secd., Oct. 21st. Capt. C. M. Crowe, M.C., Spec. Res., Oct. 26th. Capt. G. R. Elliott, D. Gds., Oct. 27th.

Flt. Comdr.—Maj. A. D. Carter, Can. Exped. Force, from a Flying Officer, Nov. 14th.

Group Instrs. in Gunnery.—(Graded as Flt. Comdrs.).—Sec. Lt. (temp. Capt.) H. J. Brewster, Middx R., from an Instr. in Gunnery (graded as an Equipment Officer, 1st Cl.), and to retain his temp. rank whilst so empld., Nov. 1st. The appointment of Lt. (temp. Capt.) N. D. G. Scott, N. Lanc. R., Spec. Res., notified in the "Gazette" of Nov 16th, is cancelled.

Park Comdr.—Temp. Maj. E. G. Mackenzie, attd. R. Fus., and to be transfd. to R.F.C., Gen. List, Oct. 10th.

SCHOOLS OF INSTRUCTION.—SCHOOL OF AERIAL GUNNERY.—Chief Instr.—The grading of temp. Capt. G. Dixon-Spain, M.C., Gen. List, is as a Park Comdr., and not as in the "Gazette" of Sept. 6th.

Gen. List.—Sjt. F. A. Barrett, from R.F.C., to be temp. Sec. Lt., Nov. 20th.

MEMORANDA.—Capt. (temp. Maj.) P. W. L. Broke-Smith, R.E., to be temp. Lt.-Col. from July 1st to Aug. 15th, 1916, whilst empld. as Asst. Dir. of Aviation.

John Alexander Turner to be temp. Hon. Lt. whilst empld. as Asst. Inspr., Aeronautical Inspn. Dept., Aug. 1st, 1917.

SPECIAL RESERVE OF OFFICERS.—SUPPLEMENTARY TO REGULAR CORPS.—R.F.C.—MIL. WING.—Lt. (temp. Maj.) O. Dwight Filley, M.C., relinquishes his commission, and is granted the hon. rank of Capt., Sept. 30th.

WAR OFFICE, Dec. 1st.

REGULAR FORCES—ESTABLISHMENTS.—R.F.C.—MIL. WING.—Sqdn. Comdr.—Lt. (temp. Capt.) C. E. H. Medhurst, R. Innis. Fus., from a Flt. Comdr., and to be temp. Maj. while so empld., Sept. 15th.

Flt. Comdrs.—From Flying Officers, and to be temp. Capts. while so empld.—Temp. Lt. T. C. Chamberlain, Gen. List, Nov. 16th. Lt. R. A. Maybery, M.C., Lrs., Nov. 18th.

Balloon Co. Comdr.—(Graded as a Flight Comdr.).—Temp. Lt. T Kennie, Gen. List, from a Balloon Comdr. (graded as a Balloon Officer), and to be temp. Capt. while so empld., Nov. 4th.

Gen. List.—Serjt. H. N. Barnard, from R.F.C., to be temp. Sec. Lt., Nov. 19th.

MEMORANDA.—Maj. S. F. McI. Lomer, K.R. Rif. C. to be temp. Lt.-Col. whilst comdg. a R.F.C. Officers Technical Training Wing., Nov. 1st, 1917.

John Andrew White to be temp. Hon. Lt. whilst empld. as Asst. Inspr., A.I.D., Aug. 1st, 1917.

WAR OFFICE, Dec. 3rd.

REGULAR FORCES.—STAFF.—The following temp. appt. is made at the War Office :—Dep. Dir.-Gen. of Mil. Aeronautics. —Bt. Lt.-Col. (temp. Brig.-Gen.) E. L. Ellington, C.M.G., R.A., from a Brig.-Gen., Gen. Staff, to retain his temp. rank whilst so empld., and to remain secd., Nov. 20th.

ESTABLISHMENTS.—R.F.C.—MIL. WING.—Flt. Comdr.—Lt. O. C. Bryson, Yeo., T.F., from a Flying Officer, and to be temp. Capt. whilst so empld., Nov. 15th.

Adjt.—Maj. G. A. E. Chapman, D.S.O., E. Kent R., Spec. Res., Oct. 29th.

FROM THE COURT CIRCULAR

BUCKINGHAM PALACE, Nov 28th.

The following Officer had the honour of being received by His Majesty, when the King invested him with the Insignia of Companion of the Order into which he is admitted :—

BAR TO THE DISTINGUISHED SERVICE ORDER.

Major Allan Wilkinson, Hampshire Regt., attd. R.F.C.

His Majesty then conferred decorations as follows :—

THE DISTINGUISHED SERVICE CROSS.

Flt. Sub-Lt. William De Salis, R.N.A.S.

THE MILITARY CROSS.

Capt. Gerald Bolitho, R.F.C.
Capt. John Letts, Lincolnshire Regt. and R.F.C.
Lt. John Wilkinson, London Regt., attd. R.F.C.
Sec. Lt. Frank Le Fevre, Lincolnshire Regt., attd. R.F.C.

NAVAL.

The following appointments have been made in the Royal Naval Air Service :—

Nov. 28th.—The following have been granted temp. commissions (R.N.V.R.), seny. as stated :—Lts. E. L. Parrett, Nov. 24th. W. Hayward and B. J. Ellis, Dec. 3rd, and appointed to "President II," for R.N.A.S.

W.O. (II).—D. S. W. Hambly, promoted to Lt., R.N.V.R. (temp.), seny. Nov. 24th.

Nov. 29th.—Flt. Commrs. (temp.).—R. Graham, D.S.C., and L. S. Breadner, D.S.O., both granted act. rank of Squadron Commr., seny. Nov. 9th.

Flt. Lieuts. (Temp.).—L. H. Slatter, B. S. Wemp, and F. E. Banbury, all granted act. rank of Flt. Commr., seny. Nov. 9th.

Flt. Sub-Lieut. (Temp.).—A. C. Burt, granted act. rank of Flt. Lieut., seny. Nov. 9th.

DEC. 1st.—The following Sub-Lts. (Flt. Lts.) have been promoted to the rank of Actg. Lt., seny. Nov. 15th :—D. Don, R. S. Sugden, R. S. Montagu, A. G. McEwan, and C. S Coltson, D.S.C.

Lt. (temp. R.N.V.R.).—C. C. Turner, promoted to Lt. Comdr. (temp. R.N.V.R.), seny. Nov. 5th.

THE CASUALTY LIST.

Reported Nov. 29th.

KILLED.—Smith, Flt. Sub-Lt. G. S., R.N.

MISSING (FEARED DROWNED).—MacAloney, Flt. Sub-Lt. R. G. R.N.

KILLED.—Dolley, B. F., Air Mech., 1st Gde., F.5039.

Reported Dec. 3rd.

KILLED.—Bernays, Actg. Comdr. L. A., C.M.G., D.S.O., R.N.

Devereux, Flt. Lt. (Actg. Lt. R.N.) E. B., R.N.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—Johnston, Actg. Flt. Comdr. P. A., R.N.

DIED OF INJURIES.—Blake, Proby. Flt. Officer I. H., R.N.

ACCIDENTALLY INJURED.—Davis, Proby. Flt. Officer A. C., R.N.

PREVIOUSLY REPORTED MISSING, NOW REPORTED A PRISONER.—Andrews, Flt. Sub-Lt. G., R.N.

PERSONAL NOTICES.

DEATHS.

BLAKE.—Probationary Flight Officer Ian Hamilton Blake, R.N., who died as a result of an aeroplane accident while flying in France, was the eldest son of John and Ethel Blake, of 19, Campton Road, Putney, S.W. He was 18 years of age.

DEVEREUX.—Flt. Lt. Edmund Bourchier Devereux, R.N., who has been killed in action, was the eldest surviving son of Mr. and Mrs. W. de L. Devereux, of Great Shelford, Cambs. Educated at Victoria College, Jersey, and at Osborne and Dart-

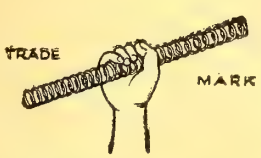
(*Continued on page* 1688.)



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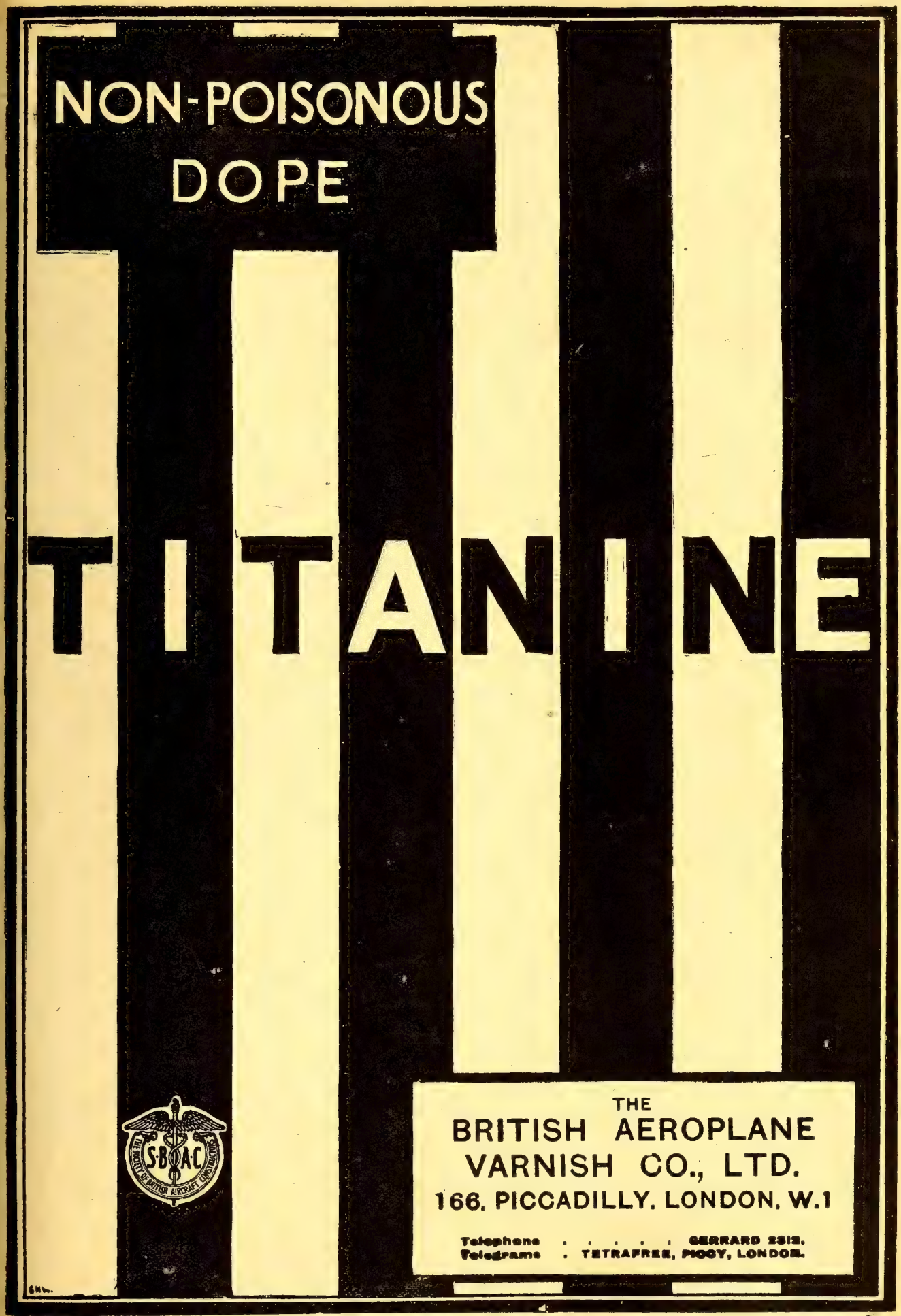
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The 260-h.p. Mercedes Engine.

[The following details of the 260-h.p. Mercedes Engine have been supplied, together with the photographs and drawings, by the Technical Department of the Air Board, to whom the Editor desires to express his thanks.]

INTRODUCTORY NOTE.

The details of the following report on the latest type Mercedes engines and the accompanying scale sectional drawings have been collected from an investigation of the twin engines taken from the captured German aeroplane G.23, a three-seater "Gotha" biplane of the pusher type, which was brought down near Vron by Lieut. Breadner on April 23rd, 1917.

The machine was set on fire by the occupants after landing and partially destroyed, one engine being scrapped and the crankcase melted. The other engine, No. 29870, however, was little damaged, with the result that after certain repairs had been carried out, this engine was able to be put through a bench test at the Royal Aircraft Factory, where the following particulars regarding B.H.P., consumption, etc., were taken.

LEADING PARTICULARS OF THE 260-H.P. MERCEDES ENGINE.

Number and arrangement of cylinders	6, vertical.
Bore	160 mm., 6.30 in.
Stroke	180 mm., 7.09 in.
Stroke/Bore ratio	1.125—1.
Stroke volume of one cylinder	3,620 cub. cms., 220.82 cub. in.
Total stroke volume of engine	21,720 cub. cms., 1,324.92 cub. in.
Area of one piston	201,062 sq. cms., 31.164 sq. in.
Total piston area of engine	1,206.372 sq. cms., 186.984 sq. in.
Clearance volume of one cylinder	920 cub. cms , 56.12 cub. in.
Compression ratio	4.94—1.
Normal b.h.p. and speed	252 at 1,400.
Piston speed	1,653 ft. per min. at 1,400. 1,775 ft. per min. at 1,500.
Brake mean effective pressure	107.5 lbs. per sq. in.
Cub. in. of stroke volume per b.h.p.	5.25.
Sq. in. of piston area per b.h.p.	0.74
H.P. per cub. ft. of stroke volume	329.14 h.p.
H.P. per sq. ft. of piston area	194.6
Direction of rotation of crank	Anti-clock.
Direction of rotation of propeller	,,
Normal speed of propeller	E.S.
Lubrication system	Forced feed to all bearings and camshaft.

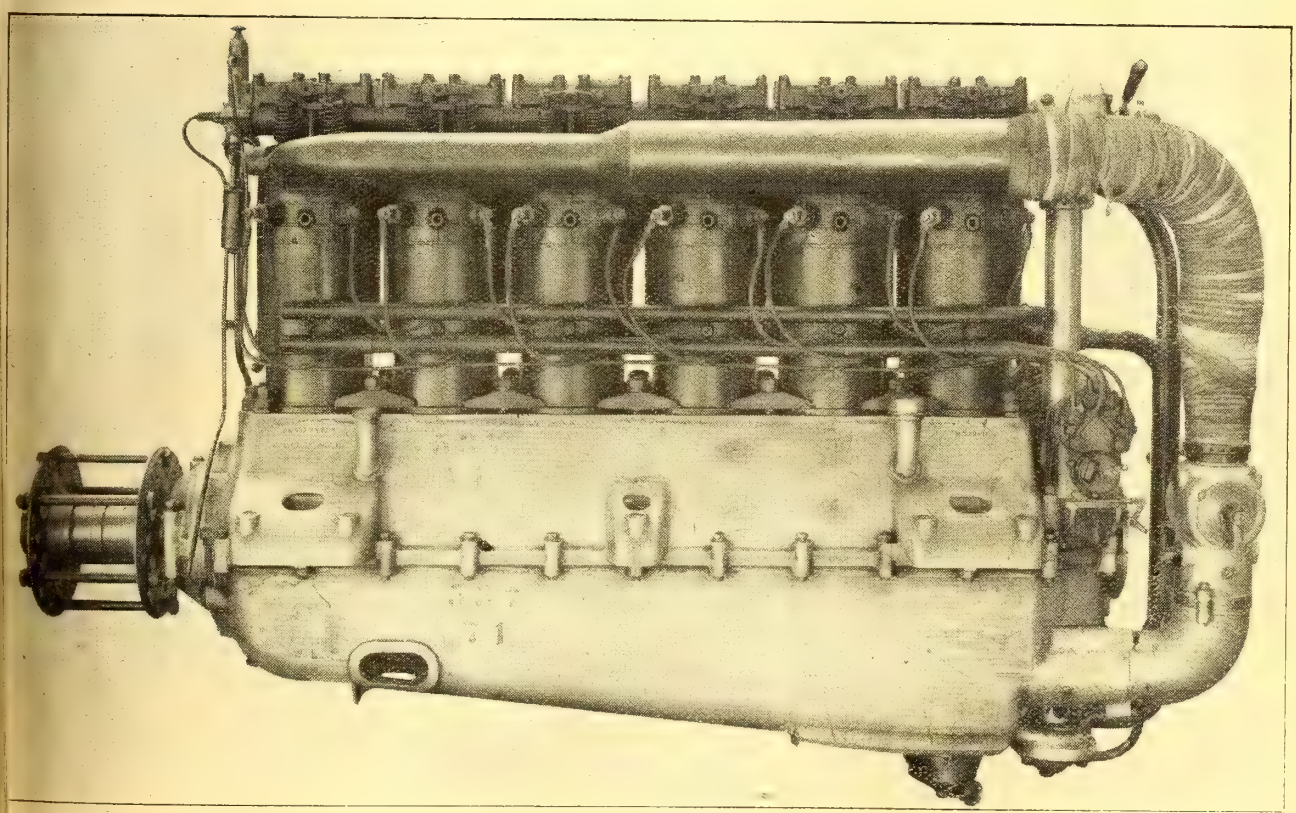


Fig. 1.—Inlet Side of 260-h.p. Mercedes Engine.

Brand of oil recommended ...	Sternoil (air cooled) on test.
Oil pressure recommended ...	No indicator.
Oil temperature recommended...	Not above 60° C.
Oil consumption per hour ...	8.125 pints.
,, ,, ,, b.h.p. hour	.032 pints.
Specific gravity of oil	.9.
Type of carburettor	1 twin jet Mercedes.
Mixture control	Automatic.
Fuel consumption per hour ...	125 pints.
,, ,, ,, b.h.p. hour	.605 pints.
Specific gravity of fuel	.720
Type of magneto	2 Z H 6
Firing sequence of engine ...	Prop. 1 5 3 6 2 4.
Numbering of cylinders	Prop. 1 2 3 4 5 6.
Speed of magneto	1.5 engine speed.
Direction of rotation of magneto, facing driving end of armature	Anti-clock.
Magneto timing	31° E.
Inlet valve opens, degree on crank	1° L.
Inlet valve closes, degree on crank	49° 3′ L.
Maximum lift of inlet valve ...	10.125 mm.
Diameter inlet valve	55.25 mm.
Area of inlet valve opening (2 valves)	35.12 sq. cm., 5.44 sq. in.
Mean gas velocity through inlet valve	151.1 ft. per second.
Clearance of inlet tappet... ...	.018 in.
Exhaust valve opens, degrees on crank	50.6° E.
Exhaust valve closes, degrees on crank	17.6° E.
Maximum lift of exhaust valve...	10 mm.
Diameter exhaust valve	55.25 mm.
Area of exhaust valve opening (2 valves)...	34.70 sq. cm., 5.4 sq. in.
Clearance of exhaust tappet ...	.018 in.
Speed of revolution counter drive	Camshaft speed.
Weight of engine complete without water, fuel or oil	936 lbs.
Weight per b.h.p. without water, fuel or oil	3.71 lbs.
Weight of exhaust manifold ...	26 lbs.
Weight of starting gear not integral with engine	Nil.
Weight of fuel per hour	136.8 lbs.
,, of oil per hour	9.14 lbs.
Total weight of fuel and oil per hour	145.94 lbs.
Gross weight of engine in running order, less fuel and oil ...	1,099 lbs. approx.
Weight per b.h.p., less fuel and oil	4.36 lbs.
Gross weight of engine in running order, with fuel and oil for six hours	2,072 lbs.
Weight per b.h.p. with fuel and oil for six hours...	8.2 lbs.
Period of induction	228°.
,, exhaust	247°.
Half compression cam opens exhaust cam	12° A.B.C.
Half compression cam closes exhaust cam	44° B.T.C.
Diameter of induction pipe branch	75 mm.
Diameter of induction pipe main	100 mm.
Diameter of choke tube	32 mm.
Length of connecting rod between centres	326 mm.
Diameter of crank pin	64 mm.
Length of crank pin bearing ...	80 mm.
Diameter of journals	64 mm.
Length of journal bearings ...	64 mm.
Length of front journal bearing ..	104 mm.
Connecting rod side-clearance (total) in piston	2.25 mm.
Total capacity of each petrol tank	95 galls.
,, ,, ,, oil tank ...	7.25 galls.
,, ,, water in system	6.5 galls.
Weight of complete cylinder with valves and springs	34.25 lbs.
Weight of complete piston with rings and gudgeon pin... ...	10.725 lbs.
Total weight of complete connecting rod with gudgeon pin bush	7 lbs.
Weight of connecting rod, big-end, complete	4 lbs. 14 oz.
Weight of connecting rod, small-end, with bush	2 lbs. 2 oz.

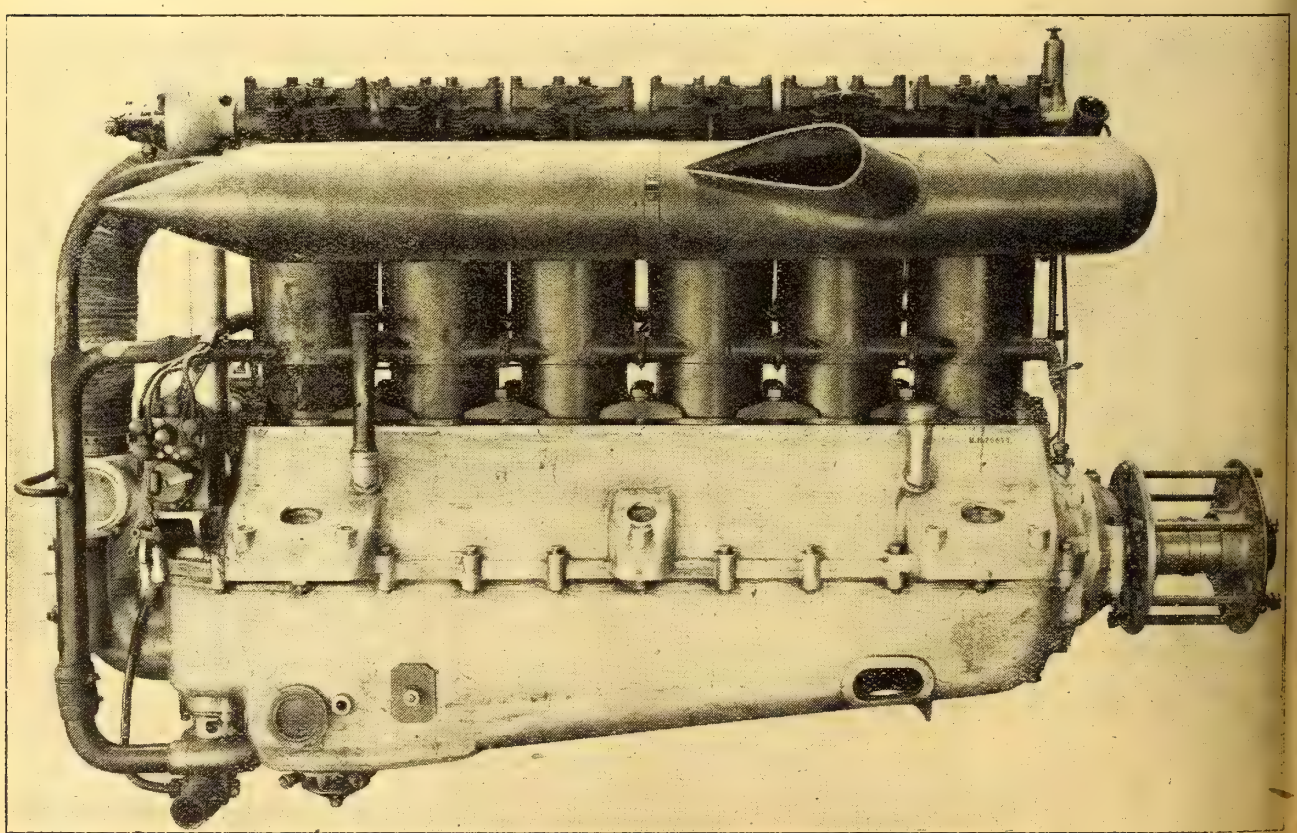


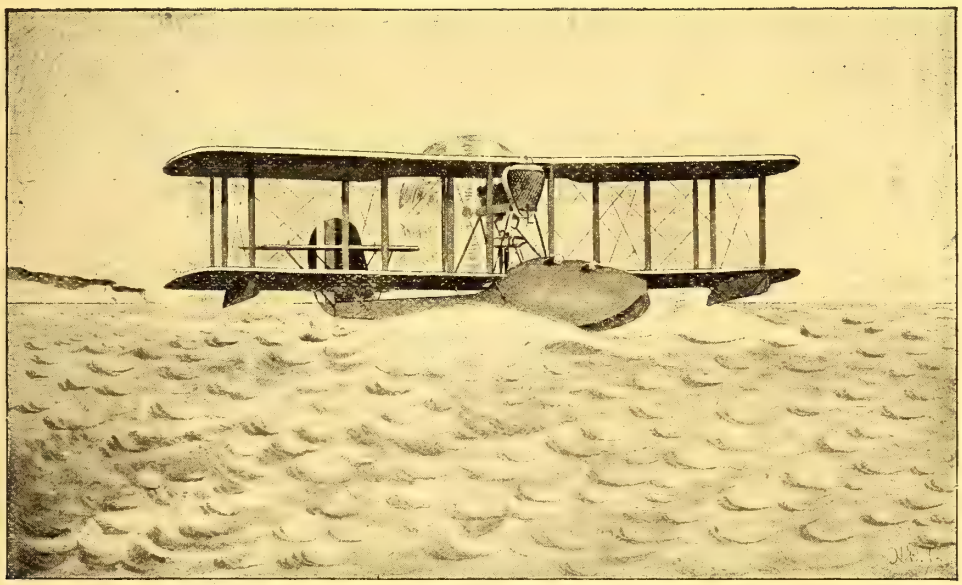
Fig. 2.—Exhaust Side of 260-h.p. Mercedes Engine.

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Weight complete valve with spring washer and nut (inlet and exhaust) ...	.759 lbs.
Weight of valve rocker complete	1.246 lbs.
Total weight of engine with water, including radiator, etc.	1,099 lbs.
Weight of crankshaft with propeller boss	approx. 139.5 lbs.
Diameter of piston at top...	159.258 mm.
,, ,, ,, bottom	159.715 mm.
Width of rings	5 mm.
Width of gap in rings in cylinder	16/1000 mm.
Diameter of water pump inlet	44 mm.
Diameter of water pump outlet	44 mm.

GENERAL DESCRIPTION.

In many respects these engines resemble the 160-h.p. Mercedes and are of the usual German aero-engine design, being of the six-cylinder vertical type, water cooled, with a massive six-throw crankshaft running in plain bearings, the design throughout aiming at strength and reliability combined with ease of manufacture in preference to the consideration of weight per b.h.p. as the primary factor in design.

The salient features of the 260-h.p. Mercedes are briefly as follows: Notwithstanding its abnormal size, the whole engine is of very proportionate and clean design throughout, as shown in the accompanying photographs and detail drawings of the engine. The complete engine, including the propeller boss, measures 6 ft. 5½ in. overall, and from the bottom of the sump to the top of the overhead camshaft casing measures approximately 3 ft. 10 in. The bore of each cylinder is 160 mm. and the stroke 180 mm. Four valves, *i.e.*, two inlet and two exhaust, are fitted in the head of each cylinder, and are operated by an overhead camshaft, running in a detachable casing of malleable cast iron supported on brackets screwed into the head of each cylinder. All the valves are interchangeable.

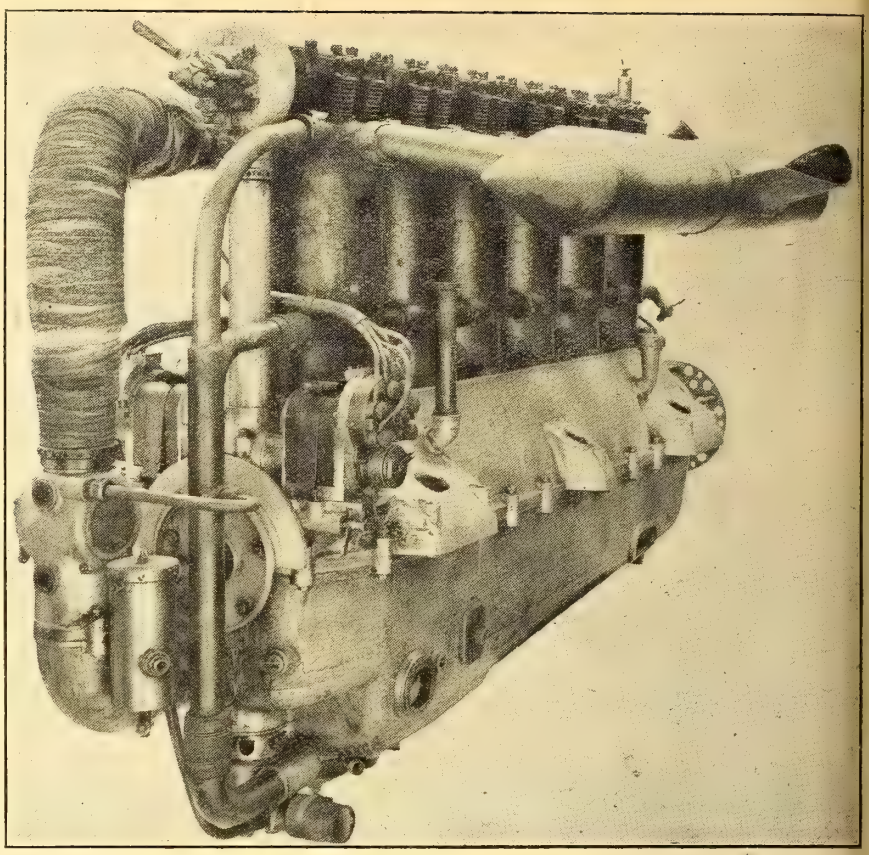


Fig. 3.—Magneto and Carburettor End.

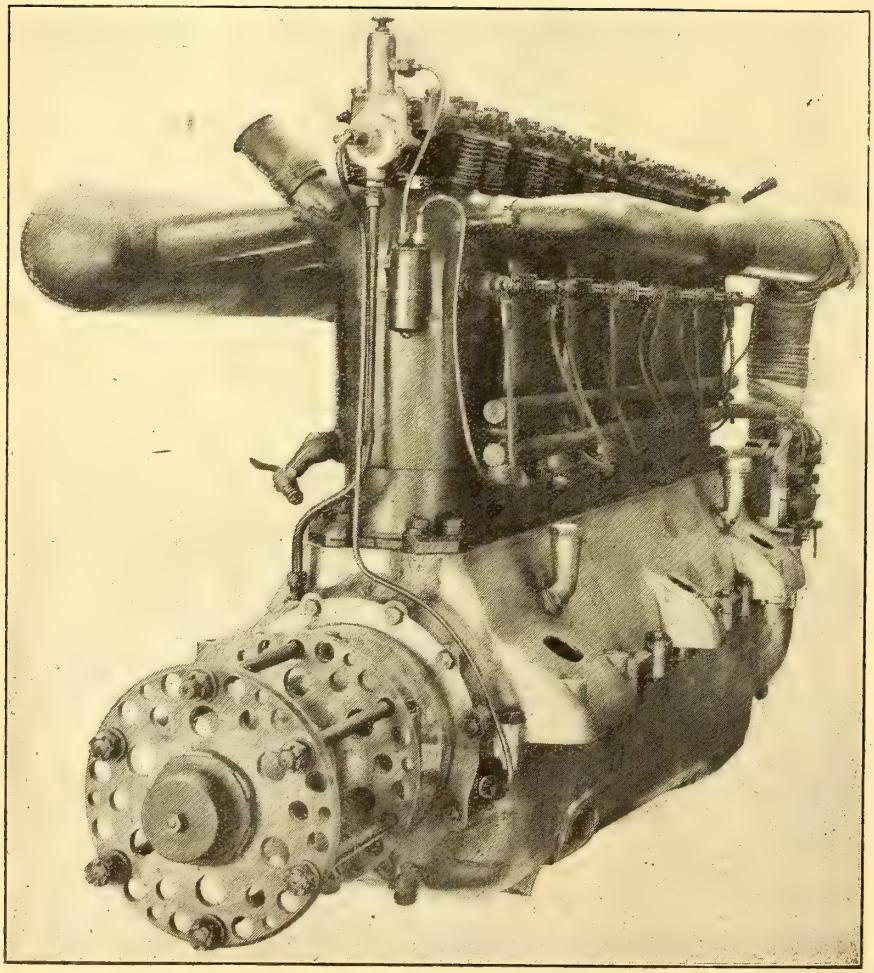


Fig. 4.—Airscrew End.

A half compression gear, employing a sliding camshaft device similar to that in the 160-h.p. Mercedes, is fitted to the rear end of the shaft casing.

A single carburettor employing a main jet and a slow running jet is attached to the rear end of the base chamber, taking its air supply from the interior of the base chamber through a 4 in. diameter passage cast in the bottom of the crank chamber, which is constructed with a false bottom.

The bottom halves of the crankshaft main bearing housings, or bearing caps, are cast integral with the bottom half of the crankcase; the long bolts which secure the bearing caps pass through the top half of the crankcase, and are used to secure the cylinders in position by triangular clamps, a design of questionable merit, but a method which undoubtedly adds increased stiffness to the crankcase construction.

The lubrication system is forced to all bearings through the drilled crankshaft from a four-throw eccentric-driven plunger pump, which is an improved design on the 160-h.p. form of Mercedes type. The scheme embodies an "auxiliary" sump in the front end of the crankcase, and small supplementary pump plungers, which work in conjunction with the main oil pump for the purpose of feeding fresh oil into the system from the service oil tank.

Full details of this lubrication system, and also of the somewhat complicated Mercedes oil pump, are given in the following description. Two Bosch Z.H. 6 magnetos are used, driven off the camshaft vertical driving shaft, one

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being a starter magneto. All plugs are fitted on the induction side of the cylinders.

The water-pump driving spindle is lubricated whilst in flight by a ratchet-driven grease lubricator worked by a cable and lever from the pilot's seat. An electric tachometer is driven at engine speed from the rear end of the camshaft through a flexible shaft.

DETAILS OF CONSTRUCTION.

CYLINDERS (Fig. 6).—The construction of the built-up cylinders, which are composed entirely of steel forgings and sheet steel, pressed to the form of the water jackets, is an interesting example of expert acetylene steel welding.

The method of building up the cylinders, and their general construction, is shown in the scale cross-sectional drawing (Fig. 7).

The steel cylinder barrels are screwed into the cylinder head, the pitch of the thread being 1.75 mm.

The cylinder barrels are machined from steel forgings, the thickness of the cylinder walls being 3.5 mm., this dimension being increased to 6 mm. at the holding-down base flange.

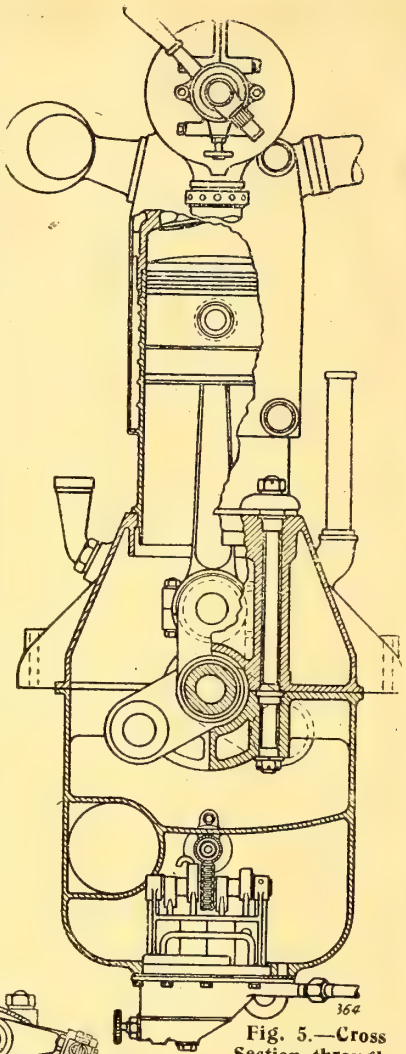


Fig. 5.—Cross Section through Cylinder and Crankcase.

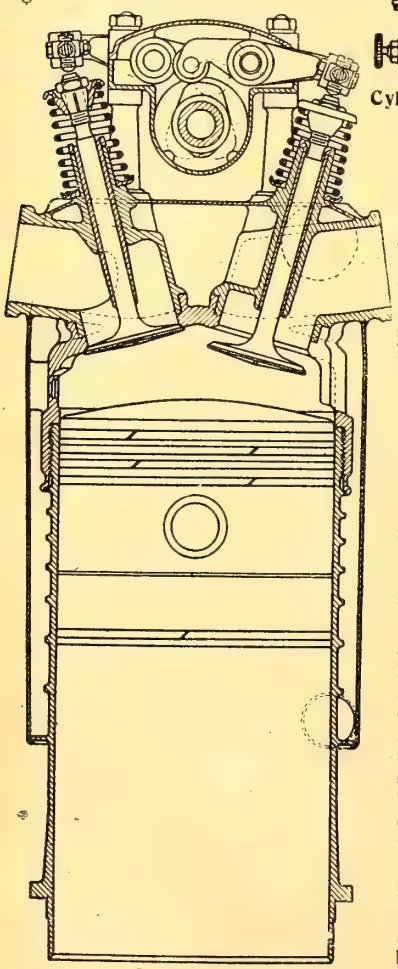


Fig. 7.—Cross Section through Cylinder and Valve Gear.

Six rectangular ribs are machined on the outer diameter of the cylinder barrel, the distance between the ribs increasing towards the base of the cylinder. The cylinder barrels extend 35 mm. below the base flanges and are of 3 mm. thickness for a depth of 12 mm.; the extension is reduced to 2.75 in thickness at the lowest part (Fig. 7).

The cylinder heads are machined from steel forgings, into which are built the four valve pockets and inlet and exhaust ports.

The valve face seatings are machined in the cylinder heads, the thickness of the crown of the cylinder head being 11 mm. The valve pockets, which are machined from steel forgings, are acetylene welded into the cylinder heads, and steel valve stem guides are pressed into the valve pockets and welded.

The valve stem guides are bushed with phosphor-bronze liners, which are pressed into the guides. It will be noticed that the exhaust valve stem guide is considerably longer than the inlet valve stem guide.

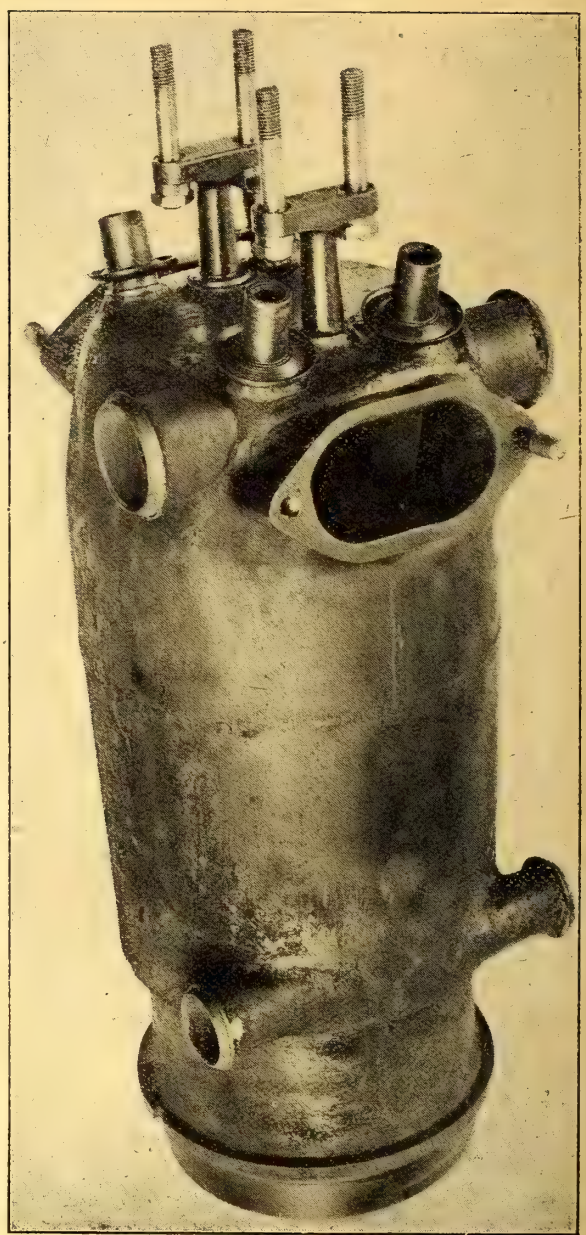


Fig. 6.—The Mercedes Cylinder.

The water-jackets are built up in four sections from sheet steel pressings 1.25 mm. in thickness, the lower section of the jacket being of barrel formation, and welded to the flange joint on the cylinder walls.

The top sections are in halves, and encircle the valve pockets, the joints being welded vertically on the centre line of the valve ports.

The top of the water-jacket is a sheet steel disc which is welded on to the flanged top sections, and the water circulation pipe connections are welded into the top and bottom of the jackets on the exhaust side.

The sparking plug bosses are fitted and welded into the cylinder barrels on the induction side just below the inlet valves.

As in the 160-h.p. Mercedes engines, the exhaust valve stem guides are water cooled by recesses formed in each of the exhaust valve pockets, so that the water is led right up to the valve stem guides.

Considering the size of the cylinders, they are remarkably light in weight. The complete cylinder with valves, valve springs, etc., including the two brackets screwed into the cylinder head to carry the camshaft, weighs 34.25 lbs.

The PISTONS are constructed in two parts, the head which carries the gudgeon pin in projecting lugs, and the skirt of the piston, into which the head is screwed.

The head of the piston is a steel forging machined all over, the thickness of the crown being 8.5 mm. The skirt of the piston is screwed onto the head and acetylene welded at the joint; the head of the piston is slightly domed, as shown in the sectional drawings (Fig. 9).

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The skirt of the piston is of cast-iron. Three compression rings are fitted in grooves cut in the cast iron skirt above the gudgeon pin, and a scraper ring at the base of the piston, the width of the ring being 5 mm.

All the rings are split at a diagonal gap of 45° and no locating pegs are fitted to maintain the positions of the rings. The gudgeon pin, which is 37 mm. in diameter, projects through the lugs on the piston head, and fits into the piston skirt, flush with the outside diameter. The gudgeon pin is fixed by an 8 mm. set screw, screwed into the end of the gudgeon pin through the boss and locked with a split pin on the inside.

The weight of the complete piston with gudgeon pin and bush is 10.93 lbs.

VALVES AND VALVE GEAR.—As previously mentioned, the twin inlet and exhaust valves are interchangeable. The maximum diameter of the head of all valves is 60 mm.; the lift of both the inlet and exhaust valves is 10 mm., and the clearance between the end of valve stem and adjustment screw of the arm rocker is 0.018 in. The general arrangement of the valves and rocker arms is clearly shown in the cross-sectional scale drawing (Fig. 7.) In this drawing the section is taken through the centre of the cylinder as far as the top of the cylinder barrel, and above this point the section is shown through one inlet and one exhaust valve, and valve gear.

The valves are operated by a single overhead camshaft, working in a detachable casing of special alloy machined all over, which is supported on twin T brackets which are screwed into the head of each cylinder.

The camshaft runs on seven phosphor-bronze plain bearings, which are mounted in aluminium bushes fitted into the bore of the camshaft casing, each bush being located by a tapered grub-screw.

The method of operating the twin valves off one cam and the general design of the camshaft and camshaft casing is of interesting design. The details of this are shown in the sectional drawings (Fig. 13.)

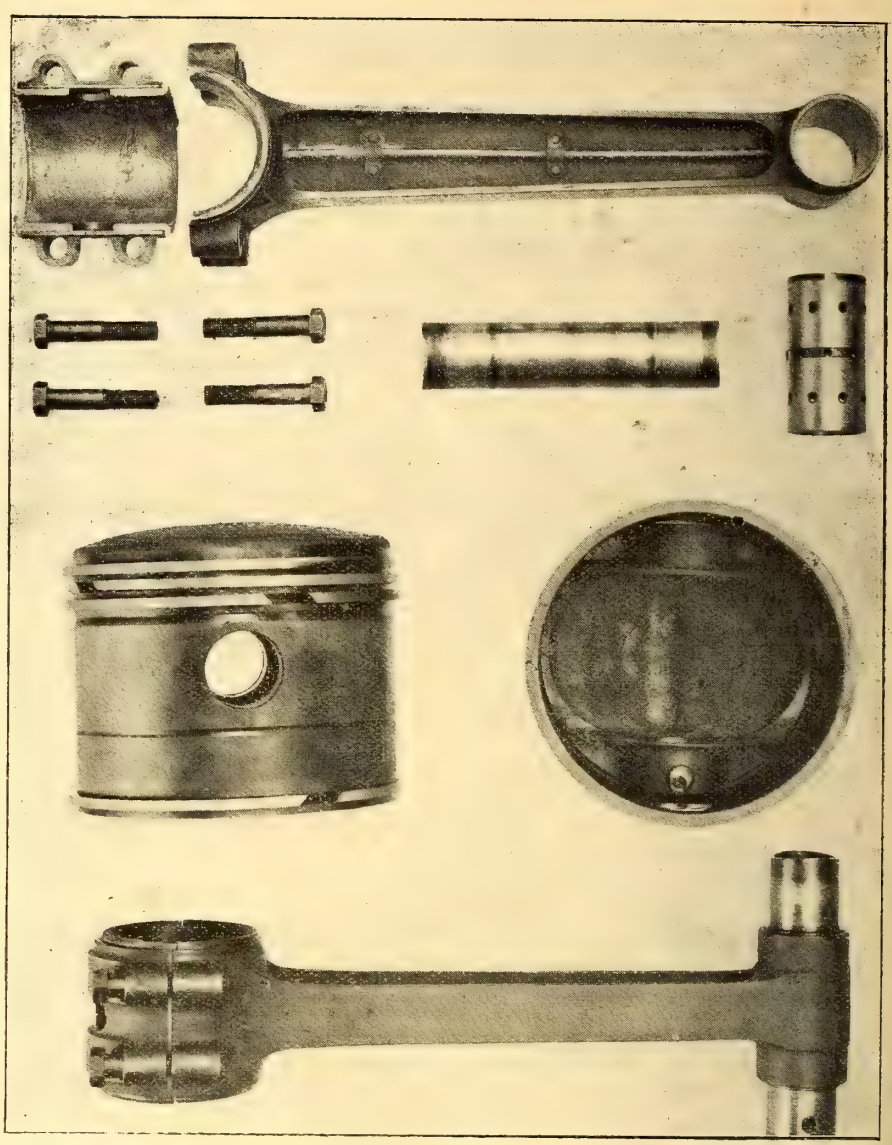


Fig. 8.—Connecting Rod, Piston, Gudgeon Pin, and Bush.

The spindle of each rocker lever is mounted on three bearings in the camshaft casing, and so designed that the cam operates the arm of the rocker lever inside the camshaft casing, whilst the other arm of the rocker operates the valve outside the casing.

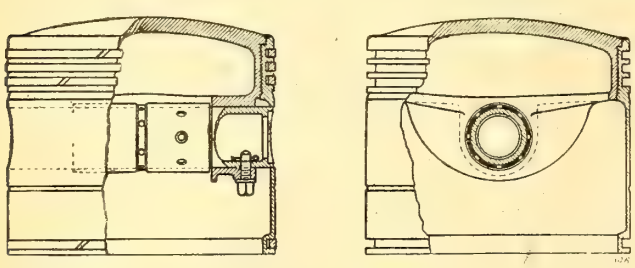


Fig. 9.—Arrangement of Piston, Gudgeon Pin, and Bush.

This arm works between two outer bearings of the rocker spindle and is situated between the separated compartments of the camshaft casing.

On the end of the outer rocker arm a double branch tappet arm is fixed which operates the twin valves (Fig. 11).

Although these branch arms do not swivel upon the valve rocker, they are not secured by a set screw or pin, being merely pressed on to the ends of the rocker arm and easily driven off.

The spindles of the valve rockers are carried directly in the camshaft casing, no gun-metal bearing liners being fitted.

The inner arms of the rocker levers, which are worked by the cams, are fitted with hardened steel rollers. The diameter of the valve stem is 11 mm., and each valve works in a phosphor-bronze bush in the valve stem guide, as already mentioned. Each valve works at an angle of 15° to the perpendicular axis of the cylinder centre line. Single helical valve springs are fitted and measure 39 mm. at the base of the coil, tapering to 31 mm at the top.

Conical based adjusting nuts are provided inside the valve spring washers for adjusting the valve springs. Details of these are shown in the sectional drawings.

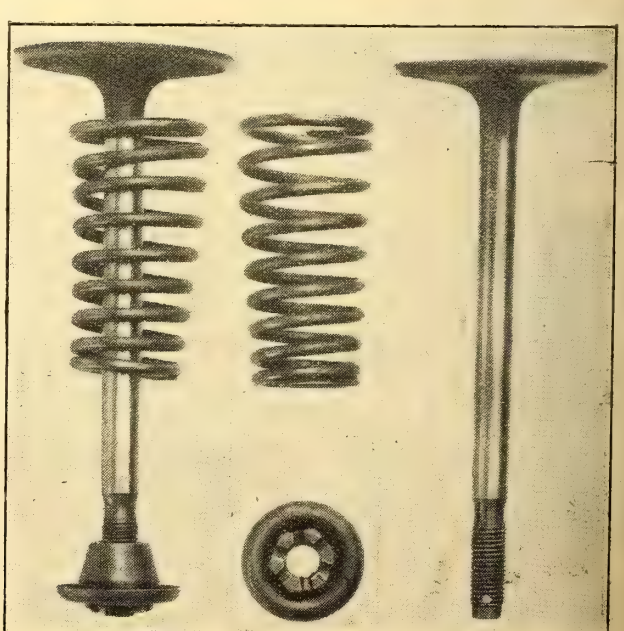


Fig. 10.—Valves and Valve-Springs.

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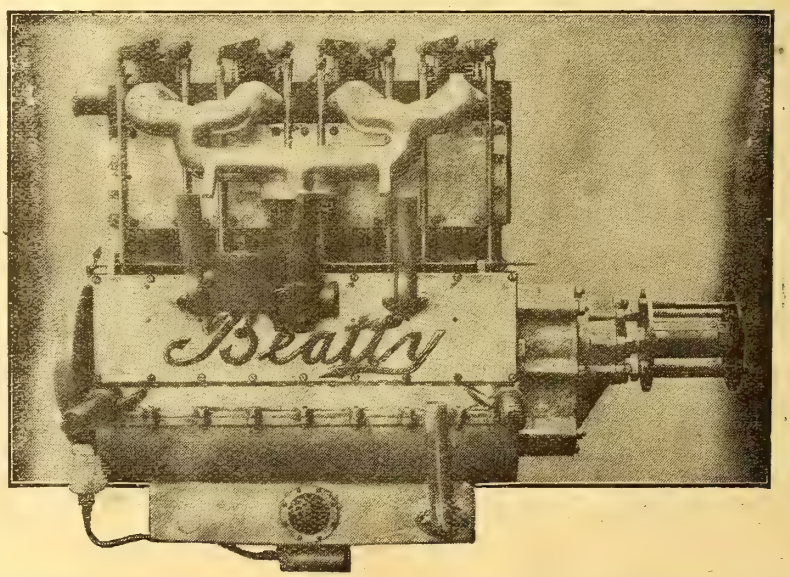
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Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 291, Leeds.
Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

Pyrometers—

The Foster Instrument Co., Letchworth, Herts.
Foster Instruments, Letchworth. Letchworth 26.

Rigging for Aircraft—

Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466 (3 lines).

Rubber Tubing & Accessories—

Hancock, James Lyne, Ltd., 266, Goswell Road, London, E.C.1. "Masticator, Isling, London." City 3811 and 3812.

Safety Belts—

Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432.

Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay, 345 (3 lines).
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.
Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.
Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton." Southampton 1337.

Searchlights and Landing Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Seats for Aeroplanes—

Bowser, E., Art Cane Works, 50 Park Lane, Leeds. Central 3437.

Shackles—

The British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow. "Golshel, Hounslow." Hounslow 254.

Sheet Metal Pressings—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.
W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk, Bham." Central 550.
British Metal (Kingston), Ltd., Kingston-on-Thames.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 497 Birmingham.
Rubery Owen & Co., Darlaston, South Staffs.

Sheet Metal Work— Thames.

British Metal (Kingston), Ltd., Kingston-on-
Evans, Joseph, & Co., Ltd., Liverpool Street Mills, Birmingham. "Adept, Birmingham." Central 733 (3 lines).
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Rubery Owen & Co., Darlaston, South Staffs.
The Acetylene Corporation of Great Britain, Ltd., 40, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.

Shock Absorbers (Elastic Cord)—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Sparking Plugs—

Forward Motor Co., Summer Row, Birmingham. Central 6250.
Hobson Manufacturing Co., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.
Lodge Sparking Plug Co., Ltd., Rugby. "Igniter, Rugby." Rugby 235.
Ripault, Leo, & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758.

Stampings— Avenue 1432.

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3.

Springs—

Dart Spring Co., West Bromwich. "Dart, West Bromwich." West Bromwich 322.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Steel—

Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.
Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham." Smithwick 224.

Steel Tension Wires—

Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466

Steel Tubes for Aeroplanes—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Taper Pins—

Mountford, Fredk. (Birmingham), Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262.

Tapes and Smallwares—

Brown, Percy, & Co., 49, Newgate Street, London, E.C.1. "Ominate, Cent, London." City 4659.
MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.
James North Hardy & Son, Ltd., 54, Portland Street, Manchester. "Hardson, Manchester." Central 6471.

Timber—

Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Entikosil, Vic, London." Victoria 5073, 4210.
Brown, R. F., & F. W., Wollaton Saw Mills, near Nottingham. "Brown's Saw Mills, Wollaton." Nottingham 1526.
J. Owen & Sons, Ltd., 199a, Borough High Street, S.E.1. "Bucheron, London."

Time Recorders— Hop 3811 (2 lines).

Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310.

Turnbuckles—

Rubery Owen & Co., Darlaston, South Staffs.

Tyres and Wheels—

The Palmer Tyre, Ltd., Shaftesbury Avenue. "Tyricord, Westcent." Gerrard 1214 (5 lines)

Varnishes—

Clark, R. Ingham, & Co., Caxton House, S.W.1. "Pearline, Vic, London. Victoria 2023.
Harland, W., & Son, Merton, London, S.W.19. "Harland, Wimbledon 45." Wimbledon 45 and 1395.
Naylor Bros., Ltd., Southall, Middlesex. "Naylor, Southall." Southall 30.

Washers— Avenue 1472.

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3.
Herbert Terry & Sons, Ltd. Redditch. "Springs, Redditch." Redditch 61.

Watchmakers and Jewellers (Silver Models)—

Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 9091 (3 lines).

Welding and Cutting Plant—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Welding Repairs—

Barimar, Ltd., 10, Poland Street, W.1. "Barimar, Reg, London." Gerrard 8173.
The New Welding Co., 26, Rosebery Avenue, London, E.C.1. "Windoneeda, Holb, London." Holborn 5252.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London."

Wind Shields— 3540 Victoria (3 lines).

Auster, Ltd., 133, Long Acre, W.C. "Winflector, London." Regent 5910.
London Label Co., Ltd., Hadley Works, Beckton Road, E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Wire Gauze—

N. Greening & Sons, Ltd., 16, Finsbury St., London, E.C.2. "Setscrew, Finsquare, London." London Wall 1082.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

Wires and Cables (Aeroplanes)—

Bruntons, Musselburgh, Scotland. "Wiremill, Musselburgh." Musselburgh 28.
Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466

Wirework— (3 lines).

Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Woodworking Machinery—

Robinson, Thomas, & Son, Ltd., Railway Works, Rochdale. "Robinson, Rochdale." Rochdale 467.
Sagar, J., & Co., Ltd., Halifax. "Sawtooth, Halifax." Halifax 136.
Wadkin & Co., Leicester. "Woodworker, Leicester." Leicester 3614.

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Acetylene Welding Plant—

Acetylene Corporation of Great Britain, Ltd., The, 4b, Victoria Street, Westminster, S.W.1. "Flammo, Vic, London." Vic 4830.

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Aeroplane Manufacturers—

Aircraft Manufacturing Co., Ltd., Hendon. "Airmanship, Hyde, London." Kingsbury 180.

Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne." Gosforth 500.

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds." Roundhay 345 (3 lines).

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.

British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol." Bristol 3066. Bristol."

British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudroplan, Crickle, London." Hampstead 5551.

Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6. Hampstead 4403 and 4404.

Davidson Aviation Co., Ltd., Hammersmith, W.6. "Accles, Oldbury." Oldbury 111 (4 lines). Hammersmith 1144-1145

Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1176.

Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 120.

Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophid, Crickle, London." Hampstead 7420.

Mann, Egerton & Co., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).

Martinsyde, Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge." Woking 331; Byfleet 171.

National Aircraft Co., Ltd., 15, Hackney Road, N.E.2. London Wall 6725.

"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London." Willesden 2455.

Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48.

The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis, London" Putney 2240-2241.

Ros, A. V., & Co., Ltd., Manchester. "Triplane, Manchester." City 8530-8531, Manchester.

Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes." Cowes 193.

Short Bros., Rochester, Eastchurch and Whitehall House, S.W. "Tegtel, Phone, London" Regent 378.

Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston." Kingston 744.

Standard Aircraft Manufacturing Co., Effingham House, Arundel Street, W.C.2. "Gunsignush, Estrand, London." City 59.

Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickersfyta, Knights, London." Kensington 6800.

Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000.

Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

White, J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes." Cowes 3

Airships—

Airships, Ltd., High Street, Merton. Wimbledon 1314.

Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, 'Phone, London" Regent 378.

Aluminium Castings (Sand & Die)

Coan, R. W., 219, Goswell Road, London, E.C.1 "Kranksaes, Isling, London." City 8846

Bearings (Etonia Cast Phosphor Bronze)—

Yorkshire Engineering Supplies, Ltd., Worsley Mesnes, Wigan. "Yes, Leeds." Central 1027.

Brass Sheets for Tipping Propellers—

Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London" City 8846

Buildings—

Avenue 695, 696 and 7066.

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation Norwich" Norwich 851.

Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313

Rubery Owen & Co., Darlaston, South Staffs.

The Wilkes Co., Ltd., Salisbury House, London Wall, E.C.2. "Wrathless, Phone, London" City 2681-2

Cable Coverings and Cable Controls—

Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Capstan Work—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Carburettors—

Hobson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.

Casein—

Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3. "Suric don, Fen London." Avenue 34 & 35.

Castings—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Castings (Aluminium, Brass, Bronze, Machined or, Rough)—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Celluloid (Non-Flam.)—

Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7. London Label Co., Beckton Road, E.16. "London Label, Canning, London." East 1300.

Clothing—

Burberry's, Ltd., Haymarket, S.W.1. Regent 2165.

Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6.

Hazel & Co., 4, Princes Street, Hanover Square, W.1. Mayfair 4971-2.

Robinson & Cleaver, Ltd., Regent Street, London, W.1. Gerrard 1070.

Component Parts—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (4 lines).

B. D. V. Aircraft Spares, Syon Chambers, 162a, Kew Road, Richmond, Surrey. "Aeros, Richmend." Richmond 1081.

Central Aircraft Co., Palmerston Works, High Rd., Kilburn, N.W.6. Hampstead 4728.

Evans, Joseph, & Co., Ltd., Liverpool Street Mills, Birmingham. "Adept, Birmingham." Central 733 (3 lines).

The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aerracrons, Canning, London." East 1300.

The Osborne Aircraft Co., Ltd., White Hill, Greenock, Scotland. "Cordage, Greenock." Greenock 618.

Cords, Tapes, and Threads—

MacLennan, J., & Co., 30, Newgate Street, E.C.1 And at Glasgow. City 3115.

Dopes—

British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard 2312.

British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellulate, London." Regent 4046.

Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawls, London." London Wall 5350-3622.

Clark, Robert, Ingham & Co., Ltd., Caxton House, S.W.1. "Pearline, Vic, London." Victoria 2923.

Electrical Accessories—

Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 1564.

Mann, Egerton & Co., Ltd., 175, Cleveland Street, London, W.1. "Installing, Euston, London" Museum 70.

Premier Electric Heaters, Ltd., 238, 250, and 360, Bradford Street, Birmingham. "Fahrenheit, Birmingham." Midland 981.

Electric Cables—

E. Kalker & Co., Coventry. "Kalker, Coventry" Coventry 248.

Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 1564.

Electric Lighting and Power—

E. Stanley Gardon, A.M.I.E.E., 67, Mosley Street, Manchester.

Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 1564.

Engines and Parts—

Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford. "Pump, Bedford." Bedford No. 1.

Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.

The Beatty School of Flying, Ltd., The Broadway, Cricklewood, N.W.2. Hampstead 3000.

Beardmore Aero Eng., Ltd., 113, Great Portland Street, W.1. "Beardmore, London" Gerrard 238.

Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London, S.W.1. "Aeroflight, Vic, London." Vic 7026.

Evans, Joseph, & Co., Ltd., Liverpool Street Mills, Birmingham. "Adept, Birmingham." Central 733 (3 lines).

Gordon Watney & Co., Ltd., Weybridge. "Mercedès, Weybridge" Weybridge 550 (7 lines).

Green Engine Co., Ltd., Twickenham. Richmond 1203

Gwynnes, Ltd., Hammersmith Iron Works, Hammersmith, W. "Gwynne, Hammersmith." Hammersmith 1040

Napier & Son, D., Ltd., 14, New Burlington St., London, W., and at Acton, W. "Nitrifier, London" Gerrard 8936.

Robertson, J. H., & Co., 1, Albemarle Street, London, W.1. Regent 3066.

Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1. "Rolhead, London." Gerrard 1634-5-6.

The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.

Engines and Parts (continued)—

Sturtevant, B. F., Co., Ltd., Hyde Park, London, U.S.A.

Sunbeam Motor Car Co., Ltd., Wolverhampton. "Moorfield, Wolverhampton."

The Gnôme & Le Rhône Engine Co., Ltd., 47, Victoria Street, S.W. "Elrhone, London." Walthamstow 408 (3 lines).

Flare Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Flexible Shafts—

Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Flying Schools—

Bournemouth Aviation Co., Ltd., Talbot Village, Bournemouth. "Etches, Winton, Bournemouth."

Cooke's (Finsbury), Ltd., Finsbury Pavement House, London, E.C.2. London Wall 573 and 674.

Furniture (Office)—

Galvanising—

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.

The Rustless Iron (Cowper Coles Process) Ltd., 1, French St., Sunbury-on-Thames, Middlesex. Sunbury 7.

Gears—

Moss Gear Co., Ltd., Thomas Street, Aston, Birmingham "Mosgear, Birmingham." East 47.

Glue—

Central Chemicals, Ltd., 283, West End Lane, London, N.W.6. "Entramical, Westhamp, London." Regent 398.

Improved Liquid Glues Co., Ltd., 61, Heritage Street, E. (Croid.). "Accroglue, Wapp, London." Avenue 398.

Mendine Co., 8, Arthur Street, E.C. Bank 893.

Oldroyd, Wm., & Sons, Ltd., 9, Mincing Lane, E.C.3

Goggles—

Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Heating and Ventilating—

Chas. P. Kinnell & Co., Ltd., 65 & 65a, Southwark Street, London, S.E.1. "Kinnell, London." Hop 372 (6 lines).

Hollow Spars—

McGruer Bentwood Hollow Spar Co., Commercial Wharf, Lanneth, S.E. "Gabrielson, Watloo, London." Hop 718, 719, and 3758.

Instruments—

British Wright Co., Ltd., 33, Chancery Lane, W.C.2. Holborn 1581.

Instruments (Scientific, Aliemeters, etc.)—

The Cambridge Scientific Instrument Co., Ltd., Cambridge. "Instrument, Cambridge" Cambridge 144.

Short & Mason, Ltd., Macdonald Road, Walthamstow, E.17. Walthamstow 1800.

Machine Tools—

Brewster & Co., 11, Queen Victoria Street, E.C.4. "Circumfuse, Cannon, London."

Magneto Driving Pieces—

Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Magnetos—

The M.L. Magneto Syndicate, Ltd., Coventry Works, Coventry. "Corlton, Coventry" Coventry 2088.

The British Lighting & Ignition Co., Ltd., 204, Tottenham Court Road, W.1. "Dynamage, Phone, London." Museum 4

Metal Manufacturers—

Clifford, Chas., & Sons, Ltd., Birmingham. "Clifford, Birmingham" Central 1

Evans, Joseph, & Co., Ltd., Liverpool Street Mills, Birmingham. "Adept, Birmingham." Central 733 (3 lines).

Metals in General—

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

Samuel Mercer & Co., 198, Upper Thames Street, E.C.4. "Reconciled Cannon, London." City 2

Pritt & Co., 46, Fenchurch Street, London, E.C.3 "Poetry, Fen, London." Avenue 695, 696 and 7066.

Metal Parts and Fittings—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (4 lines).

Aircraft Supplies Co., Ltd., Aero House, Long Acre, W.C.2. "Upcast, London" Gerrard 276 (6 lines).

Arnott & Harrison, Ltd., Hyde Road Works, Junction "Willesden Junction."

Bayliss, Jones & Bayliss, Ltd., Wolverhampton. "Bayliss, Wolverhampton" (Bolts and Nuts.) Wolverhampton 1

The Birmingham Guild, Ltd., 45, St. Chad's Street, Birmingham. "Handicraft" Central 1

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

Metal Parts and Fittings (contd.)—

British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow, London. "Golshel, Hounslow." Hounslow 254.

Hounslow Metal (Kingston), Ltd., Kingston-on-Thames.

Propellers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851

Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.

Integral Propeller Co., Ltd. "Aviprop, Hyde, London." Hendon 9, Kingsbury 104.

Lang Propeller, Ltd., Weybridge. "Aerosticks, Weybridge." Weybridge 520-521.

Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).

Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 291, Leeds.

Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.

Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

Pyrometers—

The Foster Instrument Co., Letchworth, Herts. Foster Instruments, Letchworth. Letchworth 26.

Rigging for Aircraft—

Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466 (3 lines).

Rubber Tubing & Accessories—

Hancock, James Lyne, Ltd., 266, Goswell Road, London, E.C.1. "Masticator, Isling, London." City 3811 and 3812.

Safety Belts—

Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432.

Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay, 345 (3 lines).

Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).

The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.

Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.

Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton." Southampton 1337.

Searchlights and Landing Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London" 3540 Victoria (3 lines).

Seats for Aeroplanes—

Bowser, E., Art Cane Works, 50 Park Lane, Leeds. Central 3437.

Shackles—

The British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow. "Golshel, Hounslow." Hounslow 254.

Sheet Metal Pressings—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (4 lines).

Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.

W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk, Phone, Birmingham." Central 550.

British Metal (Kingston), Ltd., Kingston-on-Thames.

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 497 Birmingham.

Rubery Owen & Co., Darlaston, South Staffs.

Sheet Metal Work—

Thames.

British Metal (Kingston), Ltd., Kingston-on-Thames.

Evans, Joseph, & Co., Ltd., Liverpool Street Mills, Birmingham. "Adept, Birmingham." Central 733 (3 lines).

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Rubery Owen & Co., Darlaston, South Staffs.

The Acetylene Corporation of Great Britain, Ltd., 4b, Victoria Street, Westminster, S.W.1. "Flammo, Vic, London." Vic 4830.

The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.

Shock Absorbers (Elastic Cord)—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Sparking Plugs—

Forward Motor Co., Sumner Row, Birmingham. Central 6350.

Hobson Manufacturing Co., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.

Lodge Sparking Plug Co., Ltd., Rugby. "Igniter, Rugby." Rugby 235.

Ripault, Leo. & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758.

Stampings—

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

Springs—

Dart Spring Co., West Bromwich. "Dart, West Bromwich." West Bromwich 322.

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Steel—

Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237.

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham." Smithwick 224.

Steel Tension Wires—

Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466

Steel Tubes for Aeroplanes—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Taper Pins—

Mountford, Fredk. (Birmingham), Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262.

Tapes and Smallwares—

Brown, Percy, & Co., 49, Newgate Street, London, E.C.1. "Ominate, Cent, London." City 4656.

MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow City 3115.

James North Hardy & Son, Ltd., 54, Portland Street, Manchester. "Hardson, Manchester." Central 6471.

Timber—

Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Entikosil, Vic, London." Victoria 5073, 4210.

Brown, R. F., & F. W., Wollaton Saw Mills, near Nottingham. "Brown's Saw Mills, Wollaton." Nottingham 1526.

J. Owen & Sons, Ltd., 1992a, Borough High Street, S.E.1. "Bucheron, London."

Time Recorders— Hop 3811 (2 lines).

Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310.

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The Palmer Tyre, Ltd., Shaftesbury Avenue. "Tyricord, Westcent." Gerrard 1214 (5 lines)

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Clark, R. Ingham, & Co., Caxton House, S.W.1. "Pearline, Vic, London." Victoria 2023.

Harland, W., & Son, Merton, London, S.W.19. "Harland, Wimbledon 45." Wimbledon 45 and 1395.

Naylor Bros., Ltd., Southall, Middlesex. "Naylor, Southall." Southall 30.

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Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

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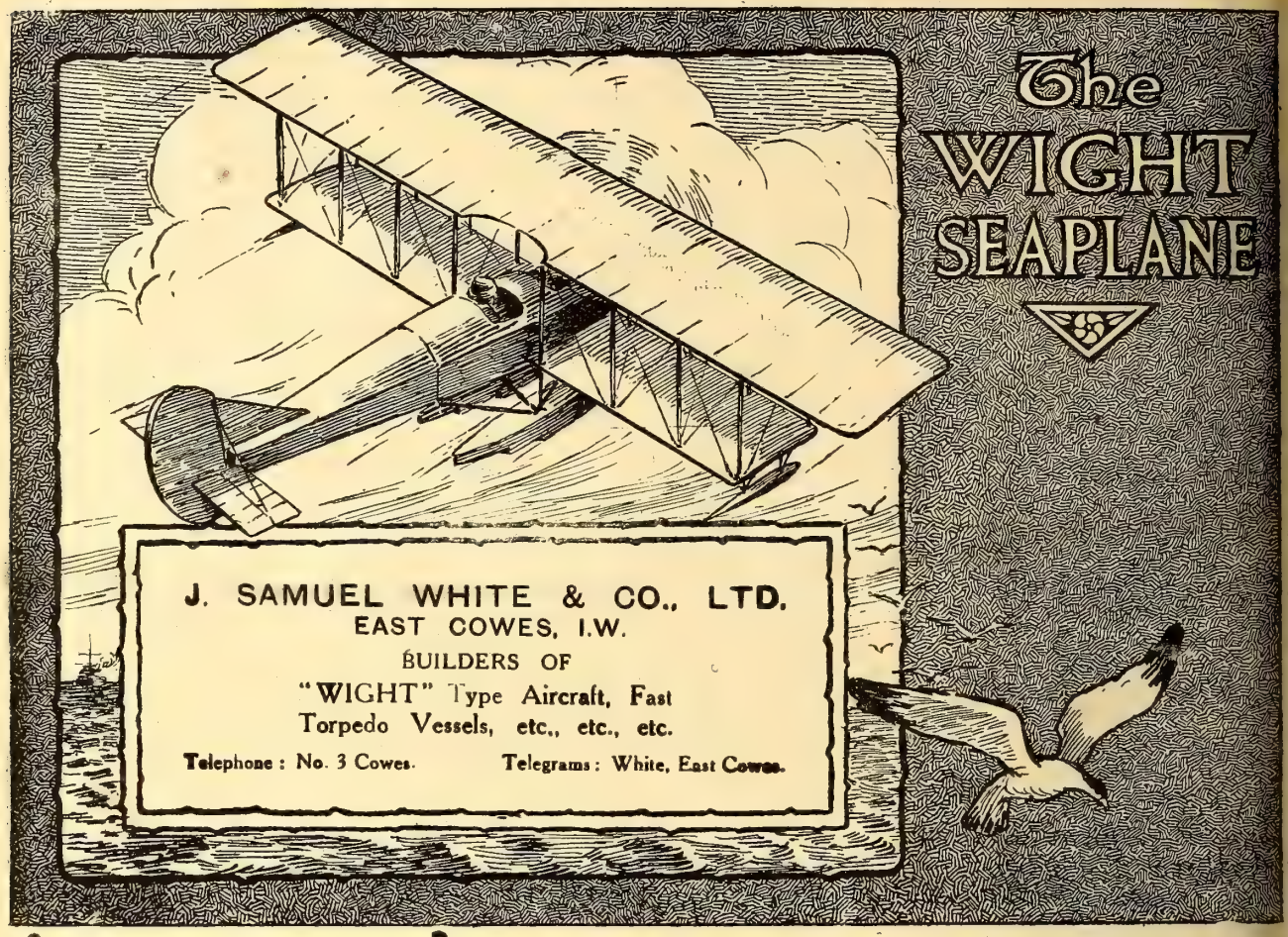
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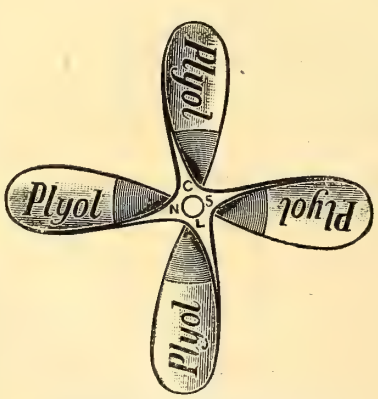
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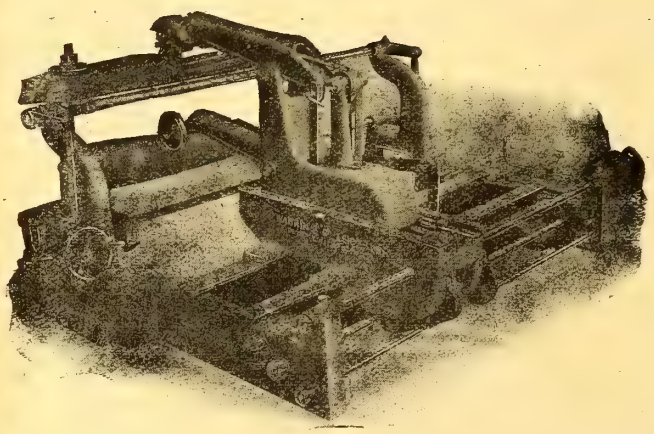
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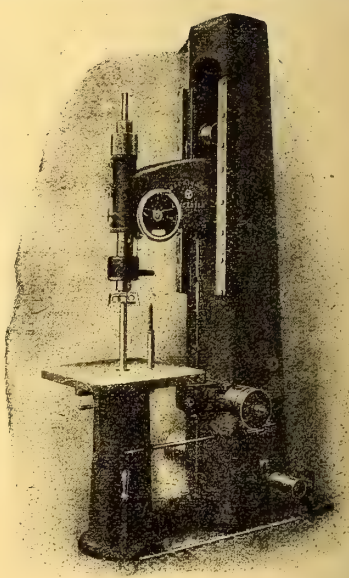
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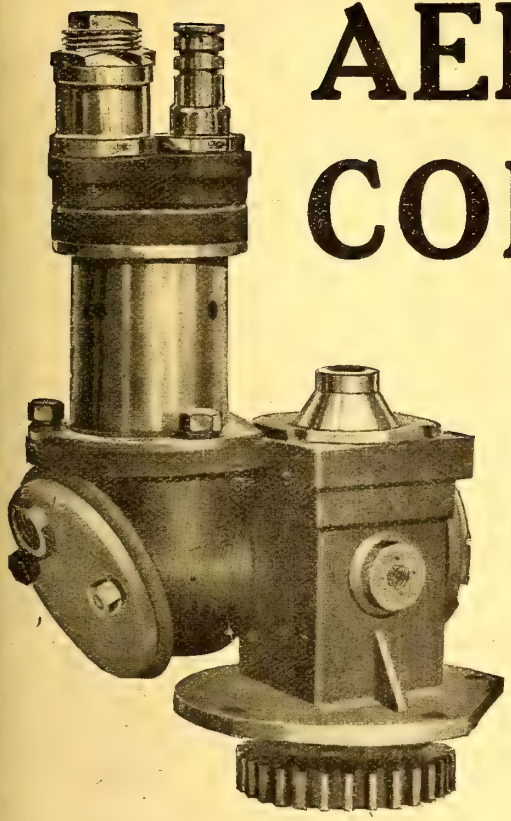
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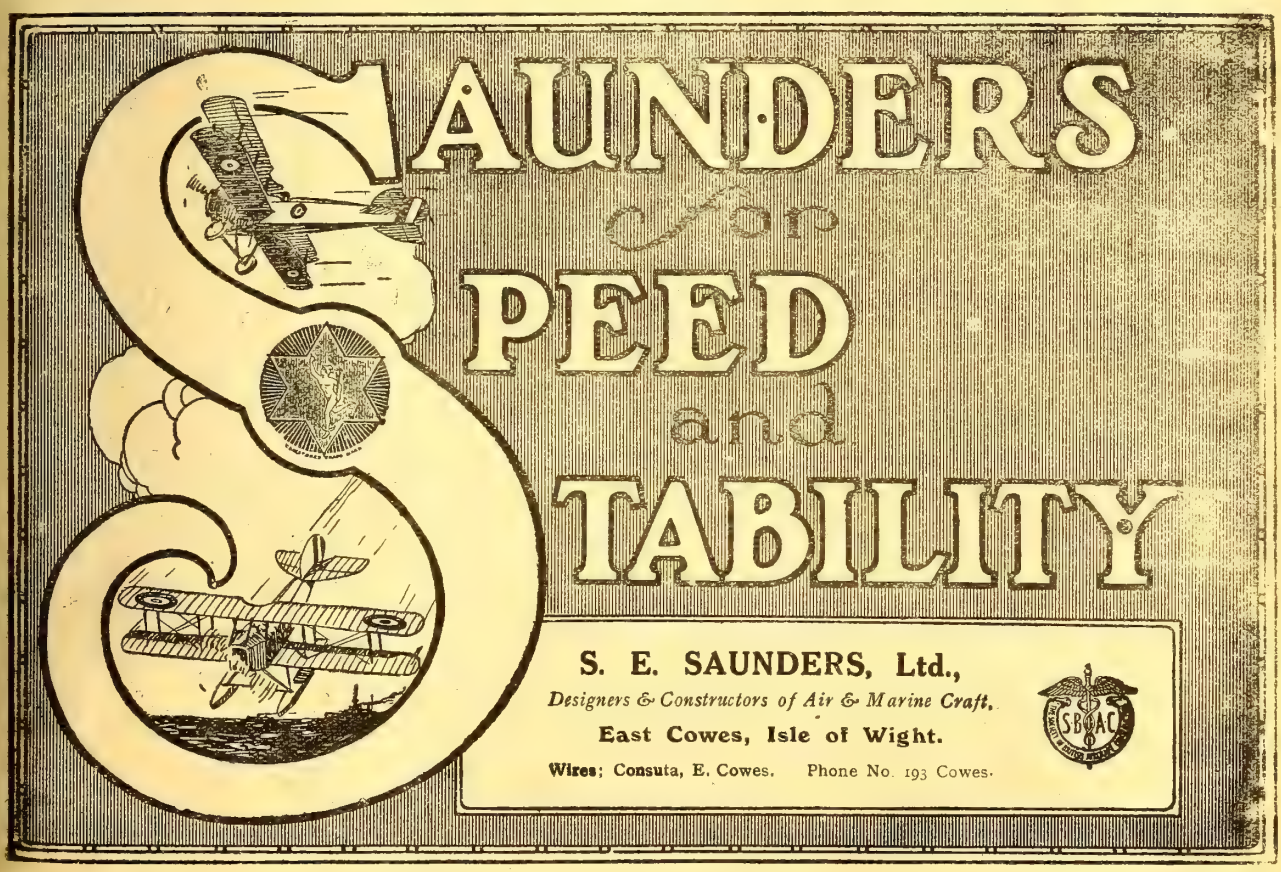
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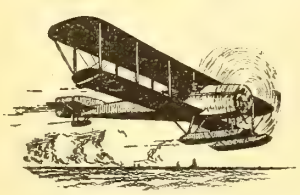
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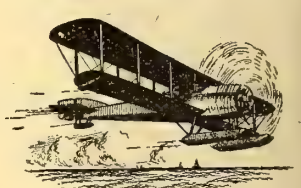
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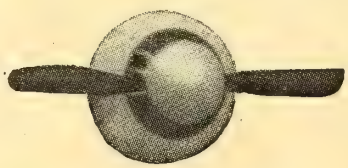
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Camshaft Drive and Half Compression Gear.—The camshaft is driven through a vertical shaft by the main distribution bevel gear mounted on the end of the crankshaft by four splines.

The method of attaching the small driving bevel gear to the top end of the vertical driving shaft is interesting. The bevel gear pinion is detachable from the shaft, and is designed so that it may be adjusted for the correct mesh in the teeth of the camshaft-driven bevel wheel. Full details of this gear are shown in Fig. 12 and also in the sketch Fig. 13, which show the parts of the gear pinion dissembled.

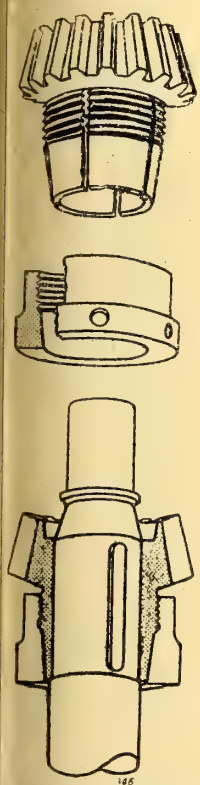


Fig. 12. Details of Camshaft Driving Pinion.

The driving end of the shaft is machined and ground parallel to 23 mm. diameter, and is fitted with a key, onto which is driven a ground taper on the bottom extension of the bevel pinion, which is split by four saw-cuts. A collar, screwing on to the lower extension of the bevel pinion, locks it securely on the vertical driving shaft.

Half Compression Gear.—In order to allow these large engines to be more easily turned over, a half compression gear is provided.

This is similar in design to that fitted on the 160-h.p. Mercedes engines.

In this type of compression release gear the camshaft is designed to slide longitudinally in its bearings, and in doing so, it brings into operation a small cam situated on the mid neutral axis of the exhaust cam, but not of course on the actual cam face.

To allow for the sliding movement of the camshaft in its bearings without disturbing the mesh of the driving bevel gears, the large driven bevel gear is provided with six rectangular serrations, which engage with corresponding serrations cut in the end of the camshaft. The bevel gear is mounted in a split gun-metal bearing which is driven into the rear end of the camshaft casing. The sliding movement of the camshaft is effected by means of a hand lever, which is set at right angles to the axis of the camshaft, and attached to a gun-metal collar, having a five start square-thread screw of 23 mm. pitch cut on its inner diameter.

This collar, which is located in an aluminium housing, operates a corresponding screw thread cut on the outer diameter of a steel sleeve, and inside the sleeve is contained a double thrust ball race and collar, which is fixed to the rear end of the camshaft. (See Fig. 13.)

In action the partial rotation of the half compression lever on the axis of the camshaft rotates the quick-thread screw of the sleeve, which pulls or pushes the end of the camshaft in its bearings through the serrated bore of the driven bevel gear. When the camshaft is drawn to its limit of movement towards the rear, the half compression cam is drawn into line with the roller end of the exhaust valve rocker arm, thus giving a slight lift to the exhaust valve as the camshaft rotates.

The half compression cam is so positioned on the camshaft as to open the exhaust valve 12° after bottom dead centre on the compression stroke, and to close it 44° before top dead centre.

The hardened steel rollers on the cam rocker arms are bevelled off at 45° on one side to allow of easy engagement of the half compression cam, which is also bevelled at 45°.

The details of this gear are clearly shown in the scale longitudinal sectional drawing of the rear end of the camshaft driving gear (Fig. 13.)

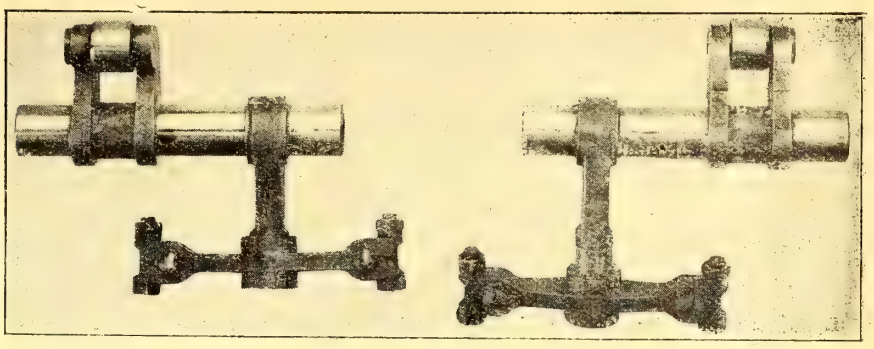


Fig. 11. Double Branch Valve Tappets and Rockers.

Connecting Rods.—The connecting rods are of normal design and are of **H** section forgings machined from steel forgings, and measure 326 mm. between centres. The total weight of the complete connecting rod, including the small-end bush, is 7 lb. The weight of the big end complete is 4 lb. 14 oz., and the weight of the small end 2 lb. 2 oz. [Presumably the connecting rod was cut exactly midway and the weights represent each half of the rod—Ed]

The thickness of the centre web of the **H** section is 2.5 mm., and that of the two outer webs is 3.5 mm. The diameter of the big end bearings is 64 mm., and the length 80 mm. These are split in the usual manner and held by four 12-mm. bolts.

The distinctive feature of the connecting rods is the floating gudgeon pin bush, the design of which is similar to that used on the 160-h.p. Mercedes. The bush is of hardened steel ground 2.5 mm. in thickness, the outside diameter being 42 mm., and the inner diameter 37 mm. The bush is a perfect working fit in the small end, and also on the gudgeon pin; and is lubricated by 14 holes of .5 mm. drilled radially in the bush, oil being supplied by a 6-mm. pipe leading upwards from the big end bearing. The pipe, which is of soft mild steel, is attached to the central web of the connecting rod by two riveted clips. Details of the connecting rods and floating gudgeon pin bush are given in Fig. 14.

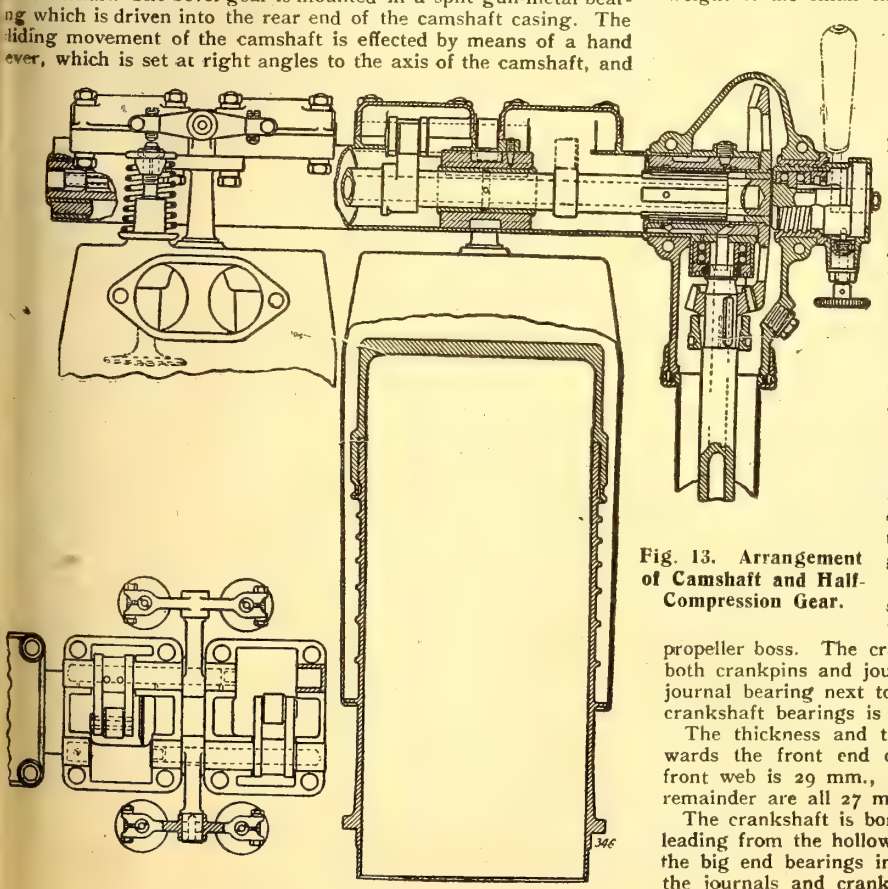


Fig. 13. Arrangement of Camshaft and Half-Compression Gear.

Crankshaft. — The six-throw crankshaft, which is of very massive design, weighs no less than 139 lb., including the propeller boss. The cranks are set at 120°, and the diameter of both crankpins and journals is 64 mm The length of the front journal bearing next to the propeller is 140 mm., and the other crankshaft bearings is 64 mm.

The thickness and the width of the crank webs increase towards the front end of the crankshaft. The thickness of the front web is 29 mm., that of the second is 28 mm., whilst the remainder are all 27 mm. in thickness.

The crankshaft is bored and the webs drilled with oil passages leading from the hollow journals to the crankpins for lubricating the big end bearings in the usual manner. The holes bored in the journals and crankpins are of decreasing diameters, accord-

ing to their distance from the oil pump and main delivery, as follows :—

Internal diameter of Hollow Crankshaft Journals.

Prop. end.	1	2	3	4	5	6
	35 mm.	35 mm.	35 mm.	38 mm.	40 mm. Oil pump.	41 mm.

Internal diameter of Hollow Crankpins.

Prop. end.	1	2	3	4	5	6
	32 mm.	33 mm.	35 mm.	38 mm.	41 mm. Oil pump.	43 mm.

The ends of the hollow journals and crankpins are plugged with sheet steel caps which are driven into the cranks, and then expanded into an annular groove cut inside the holes bored in the cranks.

To take the propeller thrust, a single thrust ball race 110 mm. in diameter is provided on the front end of the front journal bearing, and mounted in a split cage which is held in the housing of the crankcase halves.

PROPELLER BOSS.—The propeller boss, which is mounted on a taper of the crankshaft, is secured by a single key 120 mm.

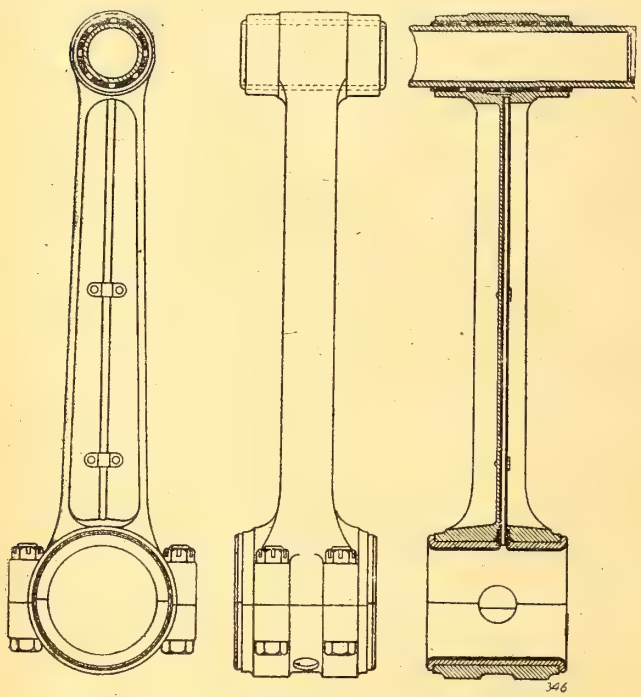


Fig. 14. Details of Connecting Rods.

long and 13 mm. wide, which is sunk in the crankshaft parallel to the taper.

The front flange is fitted on to the boss by six stepped serrations or grooves, each 29 mm. wide, and is clamped to the propeller by six 18-mm. bolts on a 230 mm. diameter circle.

The propeller boss and the front flange are both locked on the shaft by the usual Mercedes locking device, shown in the drawings of the boss (Fig. 15).

CRANKCASE.—The very clean design of the crankcase casting is evident in the photographic views of the engine. It is of very light section considering the size of the engine, the average thickness of the walls of the casing being 6 mm. The top and bottom halves are bolted together in the usual way by 26 10-mm. hollow bolts through the flange on the centre level of the crankshaft.

The crankshaft main bearing caps are cast as part of the bottom half of the crank chamber. The long 20-mm. bolts which secure the bearing caps at the bottom pass through the top half of the crankcase and act as the holding-down bolts for the cylinders, which are held in position by triangular bridge clamps.

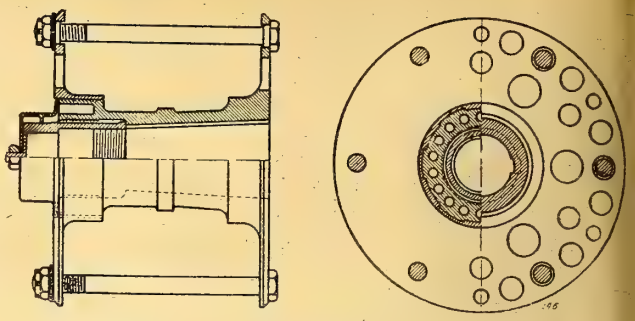


Fig. 15 Airscrew Boss and Locking Device.

The bottom ends of the cylinder barrels extend past the base flanges, and fit into the top of the crankcase; the holding-down bolts clamp each cylinder base flange at four points by the bridge pieces between each pair of cylinders.

Below the crank chamber, at the rear end is situated the mail oil sump, which contains the oil pump. In the front end of the base chamber casting below the false bottom is an auxiliary service oil sump, into which the return oil from the circulation system drains through a wire gauze filter.

The central chamber of the base chamber casting between the two sumps is used as an air chamber for the dual purpose of cooling the oil and warming the air supply to the carburettor.

Air is led by two ventilating funnels on each side of the crankcase into two oval ports in the base chamber casting, and a number of fins are cast on the under side of the false bottom inside the base chamber for cooling purposes.

The air intake to the carburettor is a large passage 4 in. in diameter, cast in the left-hand side of the crank chamber and base, as shown in the sectional arrangement drawings of the engine.

Cooling fins are also cast on the under side of the sump, and four breathers are fitted into the top half of the crank chamber between the webs of the main-bearing housings.

(To be continued.)

TECHNICAL NEGLIGENCE.

A writer of technical matters recalls the thoughtful from the broad way of perdition to which war is luring science. He claims that aero-dynamics as materialised in the chaser types of war-planes have made many steps backwards since '14.

Increase of power merely hides decrease of efficiency, and no real progress in design is responsible for the greater speed attained. Therefore, it is not on these lines that the commercial aeroplane can be successfully evolved. Facility of "penetration," as we say here, certainly seems no longer of any importance to designers.

Apropos of which one hopes to be able to exclude the new S.V.A. machine, in spite of its 250 Spa engine, a big sister of the earlier six-cylinder model, a vertical motor of what seems now the standard design of power producer here, as in the Austro factories.—T. S. HARVEY.

A DIARY FOR 1918.

Jenson and Nicholson, Ltd., of Goswell Works, Stratford, the proprietors of the well-known enamel Robbialac, are issuing to their customers a diary for 1918, produced by Charles Letts and Co. In addition to the usual dated diary, there is a separate note-book and a collection of interesting general information, to say nothing of a free insurance policy, which indemnifies one against all kinds of accidents. Jenson and Nicholson, Ltd., will be pleased to hear from any of their regular customers who fail to receive a copy of the diary within the next few days.

A CHANGE OF PROPRIETORSHIP.

One understands that the business of the London Aviation Co., Ltd., of 215, Mare Street, Hackney, E.8, has been acquired by the Jackson Aircraft Co., Ltd., the directors of which are Messrs. A. H. Botwright, A. Jackson, and C. O. Jacobs. The new company will take over all existing contracts and liabilities.



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THE PATENTS INDEX.

The subjoined list of recent inventions has been specially compiled by THE AEROPLANE from the current Official Patents Records.

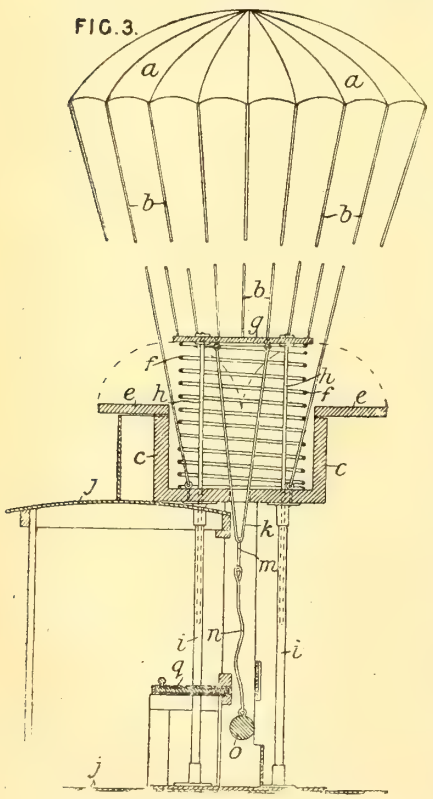
PATENT APPLICATIONS.

Boyle, E. Aeroplanes. No. 17030. Nov. 19th.
Browne, W. J. H. G. Structural framework for hangars, etc. No. 17088. Nov. 20th.
Clay, R. S. Locating aeroplane or submarine by sound. No. 17056. Nov. 20th.
Corker, J. S. Means for preventing leakage of liquid tanks perforated by shot, etc. No. 17260. Nov. 23rd.
Cragg, E. Aeroplanes. No. 17202. Nov. 22nd.
England, R. D. Method for manufacture of aeroplane propellers, etc. No. 17066. Nov. 20th.
Gaff, W. R. Aerial propulsion. No. 17040. Nov 19th.
Gilbert, J. Aircraft. No. 17133. Nov. 21st.
Highgate Aircraft Co. Spars for aircraft. No. 17121. Nov. 20th.
Jobling, T. S. Reinforced-composition propellers and aircraft members. No. 17000. Nov. 19th.
Letord, E. Controlling gear for aeroplanes. No. 17326. Nov. 23rd.
Letord, E. Means for supporting radiators on aeroplanes. No. 17327. Nov. 23rd.
Letord, E. Connecting-members for assembling and mounting aeroplane parts. No. 17328. Nov. 23rd.
Letord, E. Control mechanism for motors for aviation apparatus. No. 17330. Nov. 23rd.
Rapson, F. L. Means for propelling aircraft. No. 17120. Nov. 20th.
Robert, P. Aerial torpedoes and launching means therefor. No. 17237. Nov. 22nd.
Sayers, W. B. Apparatus for moving and controlling ailerons, rudders, elevators, etc., of aeroplanes. No. 17046. Nov. 19th.
Strong, H. Engines of aircraft. No. 17213. Nov. 22nd.
Vance, M. E. Aircraft. No. 17138. Nov. 21st.

COMPLETE SPECIFICATIONS ACCEPTED, COPIES OF WHICH CAN BE OBTAINED ON AND AFTER DECEMBER 13TH, 1917.

111124. Sept. 25th, 1916. Wilks, A. H., and Hartshorne, P. H. Internal combustion engines for aeroplanes.
111128. May 7th, 1917. Kelly, T. D. Planes for aeronautical machines.
111178. Nov. 29th, 1916. Williams, H. T. Machine for erecting or assembling the wings of aeroplanes.

ABRIDGMENTS OF RECENTLY PUBLISHED SPECIFICATIONS.

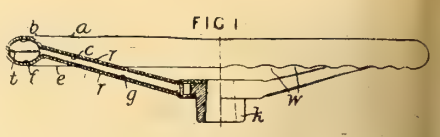


109,905. Parachutes. CAYGILL, F. J., The Grange, Wilberfoss, Yorkshire. April 4th, 1917, No. 18577/16. [Class 4.]

A parachute for use with aircraft comprises fabric *a* connected by cables *b* to a box *c* secured, for example, to the plane *j* of an aeroplane, springs *f* for ejecting the parachute when released and supporting a platform *g* upon which the parachute rests when collapsed within the box, a windlass *o* connected by cables *n*, *k* to the platform *g* for compressing the spring and a bolt *q* adapted to engage a ring *m* on the cables *n k* to hold the spring compressed. The box is fitted with hinged covers *e*, and the platform *g* carries guides *h* sliding in tubes *i*. The bolt *q* may be operated by a lever from the pilot's seat.

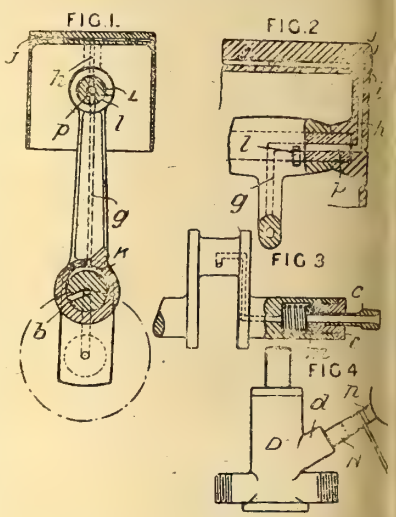
109,912. Hand-wheels. DOVER, H. W., Holyrood, St. James' End, Northampton. Jan. 13th, 1917, No. 692. [Class 80 (iv).]

A hand-wheel for use with motor-vehicles, stop-cocks, aircraft, motor-boats, gun-mechanism, etc., is built up in two parts *a*, *e*, one or both formed of stamped or pressed sheet-metal and which are held together by a casing of celluloid, exonite, or like covering compound or of non-inflammable material capable of being moulded. In the form shown, the stamped part *a* comprises the upper halves *b*, *c* of the hollow rim and spokes, and the part *e* comprises the lower halves *f*, *g*. The parts *a*, *e* are riveted to a hub *k* and covered with celluloid, etc., *r*, and the marginal parts may be interned as shown at *t*. The lower half of the rim and the rim and the whole of the spokes and the nave may be cast hollow in one piece, and the upper half of the rim formed of a stamped annulas of U-section. Tape or other fabric may be wound round the rim before the coating of celluloid, etc., is applied. Finger gaps *w* may be formed on the underside of the rim.



109,913. Lubricating. PULLIN, C. G., 18, Ranelagh Avenue, Barnes, London. Jan. 15th, 1917, No. 758. [Classes 12 (ii), 12 (iii), and 122 (iv).]

Oil is supplied by a pump to the surface of an internal-combustion engine piston during its inward stroke, and during the return stroke oil is scraped from the cylinder wall and delivered to a discharge opening. The invention is particularly applicable to a piston made of aluminium. During the inward stroke of the piston, a radial passage *b* in the crank, to which oil is pumped through a bore in the crank-shaft, registers with a groove K in the connecting rod bearing, and oil then passes through passages *g*, *p* in the connecting-rod and gudgeon pin to a passage *h* in the piston leading to a groove *i*. On the outward stroke, a sharp-edged piston ring J scrapes oil from the cylinder wall into the groove *i*, and this oil passes to an outlet formed by openings *l*, L in the gudgeon pin and small end of the connecting-rod, which have come into register, the connection between the gudgeon pin and the passage *g* being cut off by the angular movement of the connecting-rod. Fig. 3 shows a connection between the pump and the ends of the crank-shaft, consisting of a spring-pressed washer *m* on a nozzle C bearing against a plug *c*. The oil pump D, Fig. 4, has a branch *d* containing a plunger N in contact with an electric terminal *n* in the circuit of the magneto. If the oil pressure fails, the magneto circuit is broken, stopping the engine.



HAVE WE GOT THE BEST ENGINES?

Sir,—We do not want to wait till after the war to have it revealed that better engines than those in use have been turned down; most of us know it now.

What is the primary cause of so many fatal accidents? Engine failure, true. Ask any air mechanic "what part of the engine fails?" The answer is, invariably, "The Valves."

Why has the crude, uncoolable, self-destroying poppet-valve (good enough for pleasure cars, perhaps, where people have time or servants to grind the valves back to their original inefficiency) been allowed to survive for such strenuous and vital work as the aspiration of aero-engines? Not only is it a danger, but its wastefulness and inefficiency must ever prevent us from obtaining the coveted Air Supremacy.

I won't say it's the fault of our inventors; they've tried hard enough, poor devils. No! it's the fault of our slow Conservative Boards, who think that because hanging was good enough for their forefathers it's good enough for them. Sure! they'll stick to it, even though a change would win us the war.

I happen to know of two cases, doubtless there are others, in which practical engineers have spent years and thousands in perfecting, demonstrating, and finally proving their systems to be better than those in use, only to be met, after long unnecessary delays, with the rubber stamp, "Closed," by junior officials whose only recommendation is that they drove a car before the war, or were in a patent agency, or the like.

(Signed) "ONEINTHENO."

[But the curious thing is that the German continues to use poppet-valves, and gets good results out of them.—Ed.]

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Arrol-Johnston Ltd.
DUMFRIES.

THE AIRCRAFT TRADER

MARKET TOPICS.

Prices given are for quantities on usual terms.

Nov. 29th, 1917.

COPPER.—The chief interest centres round the position of affairs in America. There has, however, been no further developments. The collection of production statistics is proceeding satisfactorily, and there is every indication that the Committee referred to in a previous issue, will succeed in satisfactorily settling the difficult problems they are handling.

As regards output, the outlook is much brighter, and if nothing unforeseen happens, supplies should be very satisfactory indeed.

The position here remains unaltered, the only alteration being a reduction in the price of Strong Sheets to £147.

Comparative Prices.

To-day	£110 per ton.
Last Year's Highest	153 per ton.
Average Price, 1916	116 per ton.

TIN.—The Tin market has been full of excitement during the past month, and the price has soared to an unprecedented height. A month ago the price was in the region of £247 10s.; the lowest price paid during November has been £267 5s., and the highest price £285.

As stated previously, the three main factors responsible for the excited condition of the market were three-fold.

(1) Increased demands here and in the East.

(2) Reluctance on the part of the sellers.

(3) Uncertainty of supplies.

Furthermore, the difficulties have been increased by the Board of Trade censoring all information regarding shipments from the East. The nervous condition of the market here has also affected the position in U.S.A., and the authorities there are highly indignant. The American importers speak of "the exploitation of American consumers," and of "a point has been reached when the British Board of Trade will be forced to recognise the displeasure of American Tin buyers."

There is no indication of the position becoming easier, and the market shows signs of retaining its nervous condition.

Comparative Prices.

To-day, Nov. 29th	£283 5 0 per ton.
November 23rd	282 10 0 per ton.
November 19th	276 0 0 per ton.
Last Year	190 10 0 per ton.
Highest Price, 1916	205 0 0 per ton.

LEAD.—The position of the Lead market is unchanged. Supplies continue to be favourable. Notification has been given that the official quotations for Lead will be *nett* on and after January 1st, 1918.

STEEL.—The expected advance in the prices of Steels still remains in abeyance. There are rumours that the Ministry of Munitions intends paying subsidies to the Iron makers; nothing definite has, however, been settled.

Supplies continue fairly satisfactory, and the efforts which are being put forth to increase the output of the special Steels required for aeroplanes are bearing fruit.

TIMBER.—Objection has been taken to the remarks under this heading which appeared in The Aeroplane of November 7th. One firm, who state they have taken a large proportion of Admiralty Contracts for Silver Spruce, point out that they have not failed to execute contracts, and suggest that Canadian Spruce has been confused with Silver Spruce. Furthermore, they point out that none of the material shipped has been rejected, and every parcel was inspected by an Admiralty inspector prior to shipment.

In the first place, it must be pointed out that no inference was given that any firm had failed to execute their contracts, furthermore, no attempt was made to arrive at the cause of the shortage, but one still adheres to the statement that there is a most acute shortage of Silver Spruce, and it is well known to those who are in intimate touch with aircraft constructors that some firms have, on one or two occasions, not had a stick in the place. While it is doubtful if there are "now" sufficient supplies of Silver Spruce procurable to meet the colossal future demands, there "were" supplies available six to nine months ago sufficient to meet the present demands, which, owing to someone having failed, are not being satisfied.

Who is responsible?

The present crisis can, apparently, only be attributed to one or more of the following causes:—

(1) Failure to grasp the future (now present) requirements of the aircraft factories.

(2) Failure to allow for unforeseen contingencies, i.e., submarines, strikes, rejects, etc.

(3) Delay in authorising and securing more than ample supplies of Silver Spruce substitutes when the shortage was beginning to show itself.

(4) Failure in ensuring that the Silver Spruce was perfectly suitable for aircraft work before being shipped.

(5) Failure in providing shipping for merchants who could get the wood.

And finally, when it became apparent that a shortage was inevitable, could it not have been arranged that some other wood could be used for school machines, and the stocks of Silver Spruce conserved for exclusive use in the construction of fighters? And even if it was not thought advisable to use other woods for spars or struts, etc., surely they could have been used months ago for ribs and other small and less important parts.

Regarding the suggestion that Canadian Spruce has been confused with Silver Spruce, the latter term is the name by which Sitka Spruce or "Picea Sitchensis" is known among aircraft constructors. It is grown in the Western part of North America, being found as far north as Alaska and as far south as California. Good supplies come from Washington and Oregon.

The Canadian or Quebec Spruce is usually not at all suitable for aircraft work, and what is known as St. John's Spruce is generally worse than Quebec Spruce. Now, if the Admiralty have confused these two woods, it is quite certain the aircraft constructor has not.

The Spruce was sold to the aeroplane firms as Silver Spruce, and if, as my correspondent states, the wood was inspected by Admiralty inspectors prior to shipment, the seriousness of the position is intensified, for it is well known that only 20 per cent. to 25 per cent. of some parcels could be used, and in some instances the percentage was lower still. It is not, of course, suggested that the Spruce in question was supplied by any particular firm. The inspectors were there, presumably, to see that the wood was Silver Spruce and was perfectly suitable for aeroplane construction. Furthermore, it is not inferred that any particular firm's material was rejected as being unsuitable for aircraft purposes. The complaint is that the material delivered to some factories for the construction of aeroplanes, whether St. John's Silver, Virginian, Canadian, or Quebec Spruce, was perfectly unsuitable for the purpose for which it was apparently passed by the Government inspectors.

A few shipments of Silver Spruce have recently been received, and the Air Board are now handling the question of supplies in a very businesslike manner, and there are good prospects of the stocks of Silver Spruce substitutes being considerably increased in the near future. It is also gratifying to note that a committee has been formed to deal with the three-ply situation. Supplies are fairly satisfactory at present, but there are indications of trouble during the next few months unless the situation is handled intelligently, vigorously, and with foresight.

There have been several good shipments of Mahogany received recently. Prices are, however, gradually on the up-grade.

HOME-GROWN WOOD.—Notification has been received from the Board of Trade that in view of the large number of Timber sales impending in the near future, whether by auction, tender, or otherwise, the Controller of Timber Supplies warns would-be purchasers that it is intended very shortly to issue an Order under the Defence of the Realm Act, fixing maximum prices for the sale and purchase of standing Timber, converted Timber, and Timber in log.

The above regulation will apparently affect the price of English Ash.

FABRIC.—As stated last week, the strike is settled, the mills are again producing, and good supplies are coming through. Official prices remain unaltered.

CURRENT MARKET PRICES.

Nov. 29th, 1917.

The prices given below are the prices ruling on the above date.
TERMS.—Usual for the various materials mentioned.
Prices of old metals are as quoted by scrap dealers.
Prices must not be taken as specific quotations for definite quantities delivered to any part of the country.

ALUMINIUM.*

Ingot	£225 per ton.
Remelted	£210 per ton.

BRASS.

Sheets	15⅛d. per lb.
Strip	14⅛d. per lb.
Wire	14½d. per lb.
Tubes	15¾d. per lb.
Castings	15d. per lb.
Turning Rod	14d. per lb.
Brazed Tubes	19½d. per lb.

COPPER.

Ingot, Standard, Cash	£110 per ton.*
Ingot, Standard, 3 mos.	£110 per ton.*
Best Selected (Nett)	£123 to £119 per ton.
Sheets	£147 per ton.
Wire	15¼d. per lb.
Tubes, S.D.	18½d. per lb.
Tubes, Brazed	18½d. per lb.
Rivets	1s. 10½d. per lb., basis.
Tacks	1s. 10d. per lb.

FABRIC.*

Linen, R.A.F., 17C, Spec., 36 in. wide, 2s. 8d. p. yd.
Linen, R.A.F., 17C, Spec., 38 in. wide, 2s. 9½d. p. yd.
Spaced, R.A.F., 17C, Spec., 37½ in. wide, 1s. 9d. p. yd.

GUN METAL.

Castings ..... 1s. 8d. per lb.

LEAD.*

Virgin Pig	£29 per ton, c.i.f.
Virgin Pig	£30 per ton, ex stores.
Sheets	£39 10s. per ton, D/d.
Pipes	£40 per ton.
Dry White	£46 10s. per ton. less 5 per cent.
White in Oil	£53 per ton. (lots over 5 cwt. less 5 per. cent.)
White in Oil	£55 per ton. (lots under 5 cwt. less 5 per cent.)
Red	£42 per ton, less 2½ per cent.

NICKEL.*

Nickel ..... £200 per ton.

PHOSPHOR BRONZE.

Ingots, 5 cwt., and under..... £150 to £170 per ton.
(Subject to Copper and Tin Fluctuations.)
Castings ..... 1s. 7d. to 1s. 9d. per lb.

PHOSPHOR COPPER.

Ton lots ..... £200 to £205 per ton.

SILVER.

Silver ..... 42¾d. per oz.

SOLDER.

Plumber's	115s.
Tinman's	160s.

STEEL.*

High Speed, 14 p. cent., Tungsten, 2s. 10d. per lb., basis.
High Speed, 18 per cent., Tungsten, 3s. 10d. per lb., basis.

ALLOY STEELS TO AIR BOARD SPECIFICATIONS.‡

Round and Square :—

Specification No. S2	£86
Specification No. S2 (bright-drawn)	£115
Specification No. S8	£86
Specification No. S10	£76
Specification No. S12	£75
Specification No. S14	£43
Specification No. S15	£70
Specification No. S16	£70
Specification No. S17	£75
Specification No. S18 (oil-hardened)	£86
Specification No. K1	£75
Specification No. K2	£75
Specification No. K3	£86

The above prices are for ¼ in. to 5/16 in. only, other sizes are proportionate.

HEXAGONS.

	.455 and .525	.601 and .710
Specification S2	£79	£77
Specification S8	£79	£77
Specification S2 (bright-drawn),	£112	£112
Specification S8 (bright-drawn),	£112	£112

SPELTER.

English f.o.b., Birmingham £57

TIN.

Tin ..... £283 5s.

TINPLATES.*

Tinplate ..... 30s., basis, f.o.t.

TIMBER.

	Official.	Merchants.†
Silver Spruce,	10s. 4d.	18s., c.f.
English Ash		16s., c.f.
Mahogany,	1s. 6d. to 1s. 10d.	2s. 3d. to 2s. 8d., s.f.
Walnut,	2s. to 2s. 3d.	2s. 5d. to 2s. 9d., s.f.

ZINC.

Zinc Sheets (American)..... £110, f.o.b., New York.

SCRAP MATERIALS (LONDON PRICES).

ALUMINIUM.

Description.	Price per ton on sale to refiner, delivered at refinery.
Sheet cuttings and rods containing a minimum of 96 per cent. Al.	£160 0 0
Old rolled, etc., containing a minimum of 96 per cent. Al.	120 0 0
Spinnings, punchings, and thin small scrap; also painted and varnished scrap that needs melting, containing a minimum of 96 per cent. Al.	105 0 0
Lump scrap from aero castings and material of equivalent value, containing 87 to 95 per cent. Al.	100 0 0
Turnings and Swarf, generally containing 87 to 95 per cent. Al.	87 10 0
Scrap, generally containing 80 to 86 per cent. Al.	80 0 0
Swarf and inferior Swarf, generally containing 80—85 per cent. Al.	70 0 0
All Scrap, containing below 80 per cent. Al., not to exceed	65 0 0
All Swarf, containing below 80 per cent. Al., not to exceed	60 0 0
Brass, Heavy Selected	£88
Copper, Clean	100
Copper, Brazery	80
Gun Metal, Scrap	118
Lead, no Draft	26
Zinc, Old	40

*Official Prices.
†Includes Selection and Delivery.
‡Prices include Delivery in the U.K.

RELIABLE HACK-SAWS.

Those who are in a position to purchase hack-saw blades will do well to investigate the merits of Victor blades, which are produced by the Victor Saw Works, Ltd. (Canada). The peace-time demand for these blades had been steadily growing, but the war-trade demand for Victor blades is enormous, and has necessitated frequent enlargements of the Victor factories at Springfield, Massachusetts, U.S.A., and Hamilton, Ontario, Canada. The parent factory at Springfield is the only factory of its kind which solely manufactures hack-saw blades in U.S.A., and comprises what is claimed to be the most up-to-date and efficient plant in the world.

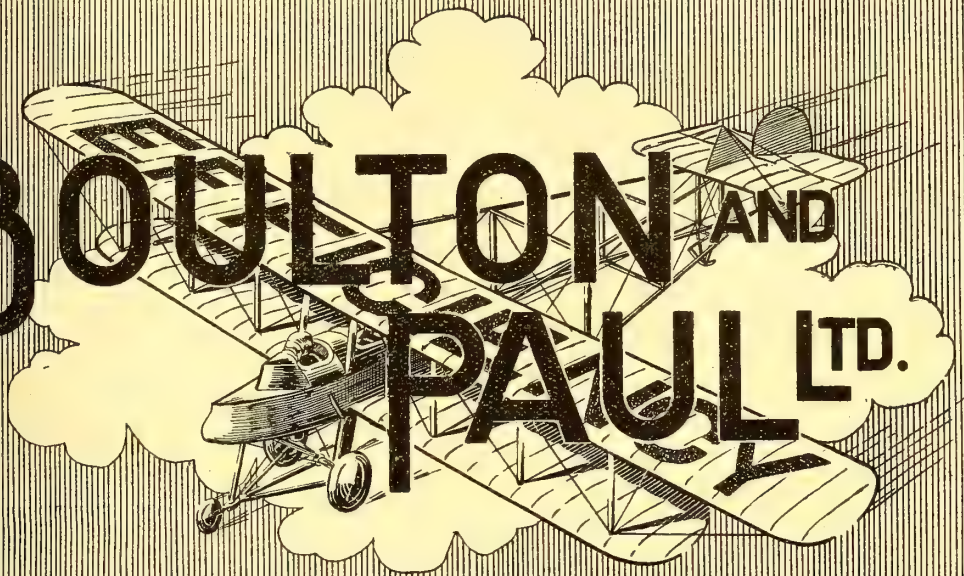
The factory at Hamilton, Canada, enjoys the distinction of being the only factory making hack-saw blades in Canada. It is the firm's policy to import for consumption in this country the product of their Canadian factory, but the urgent demand of the trade in England has caused them to utilise for quick delivery the product also of the American factory.

Since June, 1916, the Victor Co. has established an office and warehouse in London, under the direction of Mr. Isaac J. Burgess, who is a director of the Canadian Co., and manager of the British business for both the Canadian and American factories. Good stocks are held, and quick deliveries can be given

The Victor Co. is now paying special attention to the Aeroplane Industry, and firms who are having difficulty in cutting up their stock by power or by hand should communicate with Mr. Burgess, who will gladly answer their enquiries and submit samples of the best kind of blade for particular classes of work.

Mr. Burgess has an intimate knowledge of the consuming end of hack-saw business, and will welcome enquiries. Enquiries should be addressed to the firm's London House at 2 and 3, West Street, Finsbury Circus, London, E.C.

Telegrams "Aviation" Norwich. 'Phone No 851 Norwich



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AIRCRAFT FINANCE

A PUBLIC WARNING.

An extraordinary "draft" prospectus is at the present moment being submitted to certain members of the Industry with a view to obtaining financial and general support, bearing the following startling heading :—

EMERGENCY COMPANY.
(Super.)
MERCEDES-DAIMLER-GOTHA COMPANY, LIMITED.
For Aero Engines, Aeroplanes, Seaplanes, Warplanes, Biplanes, Battleplanes and Accessories.

The proposed capitalisation is fixed at £420,000, divided into an equal number of Cumulative and Participating Ordinary shares, of £1 each, and Founders shares of 1s. each. The whole wording of the prospectus is a distortion of facts and irresponsible statements emanating from a source well known on the "shady" side of Company promotion.

The first line of the prospectus begins by stating that it is "Private to our Shareholders," and the fact that there are no shareholders, condemns the document from its very start. The second line of the prospectus states that it has been filed with the Registrar of Joint Stock Companies, equally untrue. The prospectus then goes on to state that the company is formed to work "Sole concessions," and to acquire the exclusive beneficial contracts in this country of the Mercedes-Daimler-Gotha Manufacturing rights, including the right to manufacture Mercedes-Daimler-Gotha aeroplanes in the United Kingdom of Great Britain, Ireland, and the British Dominions, Colonies, and Possessions.

When one reaches this phase of the prospectus, one is inclined to think that the whole thing is a huge joke, but with a knowledge of the past history of those connected with the promotion, this charitable view is not possible. The sole aim and object being to dupe the gullible British public by the pretence that in subscribing to this company they would thereby be carrying out a patriotic duty.

Extracts from every conceivable publication are quoted and distorted. Statements are attributed to the Government, names are scattered broadcast in the prospectus, quotations of shares, and even extracts from The Aeroplane are "commandeered" to serve the purposes of this scheming group.

Claims are made for past deeds in connection with these German patents which can only have been conceived by someone suffering from a local brain-storm. The whole concoction bears on its surface the imprint of a barefaced attempt at fraud, and it is scarcely conceivable that anyone in their senses could possibly allow their names to be used in connection with it.

In any event, the general investing public are warned, and the utmost care will be taken to prevent such culpable attempts to sully the finances of the Industry, and to defraud the public.

SECRETARIES AND SHAREHOLDERS.

The Secretary of an important Aeroplane Company writes stating that it would be of mutual and general public benefit to draw attention to the general remissness on the part of shareholders. He points out that many complaints are made against secretaries of companies as a body, and he considers that this criticism is unjust for several reasons. Primarily, for the reason that they are at present under-staffed, and that many members of their Boards are engaged in military duties.

But the complaint which appeals to me most strongly is the statement that nine out of every ten transfers submitted to the company are incorrectly and improperly filled up, necessitating much correspondence, which by a little attention on the part of shareholders might easily be avoided.

A detail commonly overlooked is the necessity on the part of every transferee, as well as the transferor, being compelled to comply with Treasury regulations requiring both parties to endorse the transfer with the declaration to the effect that "the shares are not bought or sold, for, on behalf of, or for the benefit of alien enemies, either directly or indirectly."

The letter goes on to say :—"It seems scarcely credible that shareholders take so little interest in what should be one of their most important duties, viz., watching their investments; but it is curious that they will even change their residence and fail to notify the company of their removal." In this connection, I recently had occasion to examine an important balance-sheet, and was astonished to find an amount going well into four figures, under the head of "Unclaimed Dividends."

On making inquiries, I was informed that they represented dividends extending over a number of years standing to the credit of shareholders whose cheques had been returned to the company with the intimation that the shareholder had "Gone away. No address."

Another case came under my notice of a shareholder who had moved about five years ago into his present residence, and had recently had the telephone fixed to his house. He was surprised to receive a letter from the secretary of a well-known company asking him whether the address which he had accidentally seen in the telephone book was his new permanent address. He replied in the affirmative, and was surprised to receive a cheque for over £80, being accrued dividends.

I think it will, therefore, be of interest to some of the readers of this article to remind them, if they have recently changed their address, immediately to notify the fact to the secretaries of the companies in which they hold shares.

G. A.

COMPANIES' PROCEEDINGS.

SUNBEAM MOTOR-CAR CO.

INDUSTRY UNDER WAR CONDITIONS.

At the thirteenth general meeting, held at Wolverhampton, Mr. T. C. Cureton, the deputy chairman, presided in the absence through indisposition of Alderman John Marston, J.P., chairman.

In moving the adoption of the report, he said, in regard to the statement which shareholders had received a fortnight ago, that, owing to the extraordinary conditions under which the company had to work during the war, for the second year in succession the directors were unable to furnish the shareholders with the balance-sheet at the time of the annual general meeting. At the present time they were awaiting communications from the Inland Revenue Department. They felt that matters were well on the way towards settlement by comparison with the position of twelve months ago, but as a precautionary measure they had reduced the rate of dividend recommended this year.

War work under the control of a wide variety of Government Departments, with each of which their relations were pleasant, was, nevertheless and unavoidably, increasingly complicated. Unhappily it remained a fact that they suffered from an absence of co-ordination between the various departments with which they were concerned under different heads. Their extra output of absolutely essential munitions of war involved the employment of very much greater capital. This would have been so if they were working under peace conditions, but it is emphasised in time of war for several reasons.

Increased Working Expenses.

"Firstly," he said, "costs are going up against us all the time, as you may gather, for example, from the succession of Government awards by way of increases in wages to members of the engineering trades. There have been no fewer than two during the financial year under review, and another, the largest of all, was made only last month. We do not know when or where this process will end. The increases in wages accorded in the year under review will represent an extra cost to this company of more than £50,000 per annum on the wages alone, but this is not all. These awards operate throughout the country, and consequently they have their effect on the raw materials we require for our manufacturing processes.

"In some cases the cost of raw materials has risen 125 per cent. and more during the year. Therefore, to produce more articles requires a more than corresponding increase in capital outlay by the carrying of a much larger stock—a point which is far too apt to be overlooked. Secondly, there is an inclination all round in Government Departments to buy at contracted prices. Thirdly, whereas in peace time, once our products are made and delivered, we receive prompt cash for them, in war time we are out of our money for long periods. Moreover, in some instances, our accounts are only paid up to a certain date, the balance being left over indefinitely. Obviously, therefore, all these conditions render the propositions of financing an undertaking of increasing magnitude more difficult than it was formerly. Consequently it is essential for your directors to be extremely cautious in regard to their financial policy at this juncture, particularly as any further increase of output will probably involve the extension of premises and plant."

EXPANDED PRODUCTION NECESSARY.

Continuing, the chairman said that since the conditions of production were nowadays so hampered by the Government departmental system dealing with controlled firms, to say nothing of additional taxation, it might be asked why bother about increasing output with all the attendant worries and difficulties it involves at this juncture. The answer of the directors was that, among other things, the safety of the Empire, as well as that of our Allies, depends upon our seizing and maintaining the mastery of the air. The Sunbeam Company could render very signal service to the cause of civilisation by the munitions which they are able to produce. In these circumstances the shareholders would agree with the directors in using every effort to give the Government and the Allies, both directly from the company's own works and from other factories producing their munitions under licence, every advantage of maximum output obtainable, for they did not forget that if we lose the war the property ceased to be of value. Apart from that, they must be holding up a great goodwill for the post-war period by first and last resolving that nothing they could do should be left undone to bring this appalling conflict as speedily as possible to a successful end.

Moreover, if they reviewed the financial history of the firm for the last twelve years they would find that the average dividend paid was about 20 per cent. Therefore, the dividend which the directors recommended in respect of the year ended August 31st last was an average one, and one of which any industrial concern might well be proud.

Proceeding, he said that the end of the financial year under review saw the Sunbeam business established on a broader basis than ever before, and enjoying a higher reputation, not merely within the Empire, but internationally. Everything in the way of anticipated development at the time of the last general meeting had been successfully realised. (Applause.)

AIRCRAFT ENGINES.

Mr. LOUIS COATALEN, chief engineer and joint managing director, in seconding the resolution, said that from the point of view of the technical director he could endorse everything Mr. Cureton had said from the business and financial points of view. In that year numerous additions had been made to the list of the foremost manufacturers in this country who were being required by the Minister of Munitions to make the Sunbeam-Coatalen products under licence. "Since last we met," he said, "the Censorship has released certain illustrations of some of the ever-lengthening series of aircraft engines, on the evolution and production of which we are engaged. From these you may have a hint of how very different are the demands of to-day from those that obtained at the time war broke out.

"Apart from the growth of the various branches of our business under all heads, since our last meeting we have added yet another fresh branch to our business, though the Defence of the Realm Act does not allow me to specify it. I may say that it is one which we regard as possessing notable possibilities. Obviously, it is impossible to say anything about our latest products. I can only assure you that experimental work has been continued ceaselessly, and with a measure of success which I should have scarcely dared to foretell at about this time last year. To-day our products are being produced under licence, not merely widely in this country, but also on the Continent of Europe, in Canada, and in the United States of America. As far as our knowledge of British motor engineering enterprise goes, that is a position which is practically unique." (Applause.)

INCREASE IN STOCKS.

Mr. W. M. ILIFF, joint managing director, in supporting the resolution, said they hoped to present the balance-sheet on an early date. Negotiations with the authorities on matters of finance had to be carried through carefully, not hastily. They wanted as much cash in the business as they could retain. Practically 100 per cent. more stock was now carried than in the year 1915, when the accounts were last published. On the subject of royalties in the case of their products made under licence, he would like to point out that, under the Excess Profits taxation scheme, they were allowed to retain one pound in five only, which was further offset by heavy costs in connection with experimenting. From the managerial point of view they continued business under circumstances which required more than ordinary vigilance.

The report was thereafter approved, and the dividend recommended by the directors was confirmed. In addition to the usual Preference dividend, the dividend on the Ordinary shares was at the rate of 15 per cent. for the year, free of tax, together with a bonus of 1s. per share, also free of tax.

HUMBER CO., LTD.

The ninth annual meeting of this company was held at Coventry on November 28th. Mr. E. Powell, the Chairman of the Company, who presided, prefaced his remarks by calling attention to the large increase in stock-in trade, amounting to £427,000, due to the necessity of complying rapidly with Government requirements.

The Chairman went on to state "On the outbreak of war our works came almost to a standstill in consequence of the cancellation of the great bulk of orders then on hand. Gradually business recovered and the demand for our cars and cycles became greater than the capacity of our works, especially in view of our depleted staffs. Then we were placed under Government control, and have gradually been absorbed in Government work, with the result that we are at present almost exclusively engaged on work for the War Department.

"Notwithstanding this, however, it is satisfactory to say that the profit disclosed enables us to pay two years' dividend to our Preference shareholders, being all to which they are entitled to August 31st last, and so clearing a way for the payment of dividends on our Ordinary share capital.

"This is the first time in the past nine years that we have been in the happy position, and I trust that at the end of the current financial year, we shall be able to reward the patience of our shareholders, by the payment to them of a dividend."

The Chairman added that since the closing of the accounts the output had far exceeded that of the corresponding period of last year, and this appeared likely to continue during the whole of the current financial year.—G. A.

MORTGAGES AND CHARGES REGISTERED.

WHITEHEAD AIRCRAFT (1917) LTD., Richmond. Registered Nov. 13tth, £1,400 mort., to R. Newman and others; charged on freehold hereditaments, etc., at Feltham.

NEW COMPANIES REGISTERED.

The files of the following new companies registered with the nominal capitals of £5,000 and upwards are now available for inspection at Somerset House:—

JACKSON AIRCRAFT CO. (LTD.).—Registered Nov. 23rd, £10,000, in £1 shares (7,500 Pref.) 215, Mare Street, Hackney.

ENGINEERING AND AIRCRAFT CONSTRUCTION CO. (LTD.).—Registered Nov. 26th, £5,000, in £1 shares. 329 High Holborn, W.C.1.

CLOSING OF TRANSFER BOOKS.

THE AUSTIN MOTOR COMPANY, LTD.—Preference shares.—Notice is hereby given that the transfer books of the Company will be closed as and from the 13th day of December ot the 28th day of December, 1917, both days inclusive.—By order of the Board. A. W. JONES, Secretary.

DIVIDEND NOTICES.

BROWN BROTHERS, LTD.—The directors announce a dividend on the Ordinary shares at the rate of 2½ per cent., free of income-tax.

[Owing to pressure on space, it has been necessary to hold over "Answers to Correspondents" and various articles of interest.—Ed.]

CURRENT SHARE QUOTATIONS.

Aircraft Mnfg. Co.	7% cum. pref. £1 ...	24-	25/-
	7% cum. & ptg. "B" pref., (fully paid) ...	23/-	24/-
Armstrong (Sir W. G.) Whitworth & Co., Ltd.	4% cum. pref. £5...	3⅛	3⅜
	5% 2nd. pref. £1 ...	17/-	18/-
	£1 ordinary	42/-	43/-
Austin Motor Co., Ltd.	7% cum. pref. £1...	18/-	19/-
	£1 ordinary	25/-	26/-
Birmingham Small Arms Co., Ltd.	£1 ordinary	53/-	54/-
	5% cum. "A" pref.	4⅛	4⅜
	6% cum. "B" pref.	19/-	20/-
Boulton & Paul, Ltd., 5% cum. pref. £1		⅜	⅞
Brown Bros., Ltd., 6% cum. pref. £5...		4⅝	4⅞
Darracq (A) & Co., (1905) Ltd.	£1 ordinary ...	34/-	35/- x
	7% cum. pref. £1...	23/-	24/- x
Electric Construction Co., Ltd.	7% cum. pref. £1 ...	20/-	21/- x
	£1 ordinary	24/-	25/-
Fellows Magneto Co., 8% cum. partip. pref.		16/-	17/-
General Electric Co., Ltd.	6% cum. pref. £10 ...	10¼	10¾
	£10 ordinary	19¾	20
Gwynnes, Ltd., 5% cum. pref.		91/-	92/-
Ordinary		9/-	9/6
Greenwood & Batley, Ltd., £10 ordinary		9⅞	10
Humber, Ltd., 6% cum. pref. £1		14/-	15/-
£1 ordinary		19/-	20/-
Napier (D) & Son, Ltd., 7½% cum. pf. £1		18/-	19/-
Peter Hooker, Ltd., £1 7% cum. partic. 1st pref.		19/6	20/-
Rolls Royce, Ltd., £1 ordinary		65/-	66/-
Rudge Whitworth, Ltd. £1 ordinary ...		50/-	51/-
Ruston, Proctor & Co., Ltd.	£1 ordinary	28/-	29/-
	5% cum. pref. £1 ...	17/-	17/6
Sunbeam Motor Car Co., Ltd., £1 ord...		79/-	80/- x
Straker Squire, Ltd. (1913), £1 ordinary		23/-	24/-
S. Smith & Son, Ltd. (Motor Accessories) £1 ordinary		28/-	29/-
Triplex Safety Glass, £1 ordinary... ...		25/-	26/-
Vickers, Ltd., 5% pref. stock...		78	82
5% pref. shares. £1 ...		17/6	18/6
£1 ordinary		42/-	43/-
Wm. Beardmore & Co., Ltd., 6% c. pf. £1		18/-	19/-

GENERAL INFORMATION.

Armstrong, Whitworth (1916).
Austin Motor (1916).
B'ham. Small Arms (1915-16).
Rolls Royce.
Rudge Whitworth.
Straker-Squire (1915).
Sunbeam Motor.
Thorneycroft (J. I.) & Co.
Vickers (1915 and 1916).

Owing to the difficulty of estimating liabilities under Finance and Munitions Acts, the accounts will not be ready until a later date.

x—ex dividend

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(*Continued from page* 1650.)

mouth Colleges, he served in His Majesty's ships "Warrior" and "Agincourt," and was present in the latter at the Battle of Jutland. In January of 1917, he answered to the call of the Admiralty for volunteers for the Royal Naval Air Service, and met his death while on patrol duty in the North Sea.

JOHNSTON.—Flt. Comdr. Phillip A. Johnston, R.N., who was killed on Aug. 17th, through a collision during an air fight, was the only son of Mrs. E. Johnston, London, and the late A. Johnston, M.E., Gundagai, grandson of late Dr. Robert G. Johnston, Monahan, Ireland, and the late Phillip Davies, Consulting Mining Engineer, Sydney. He was 19 years of age.

SMITH.—Flt. Sub-Lt. Geoffrey Smith, R.N., who was killed on Nov. 24th, aged 18, was the eldest son of Mr. and Mrs. G. W. Smith, of Derby Road, Caversham, Oxon. He was educated at Marlborough House School, Reading, and Marlborough College, and joined the R.N.A.S. from the college O.T.C. on attaining the age of 18 last May. He was gazetted in Sept., and proved himself a skilful pilot. Mr. Smith was a prefect at Marlborough, where he was studying for the engineering profession. He was a good all-round athlete, and gained his school colours for football and hockey last winter. His father is manager of the Reading branch of Barclay's Bank.

Marriages.

GARDNER—GARDNER.—On Nov. 26th, by special licence, at St. Mary Magdalene, Addiscombe, Charles Leslie Calhan Gardner, Petty Officer, Russian Armoured Car Division, R.N.A.S., only son of Councillor C. Gardner, of Sutton, Surrey, was married to Ethel Margaret Anne, only child of Mr. and Mrs. T. Gardner, of Addiscombe, Croydon, by the Rev. T. Bentham, M.A.

ENGLAND—CARR.—On Dec. 1st, at All Souls, St. Margarets-on-Thames, Sqdn.-Comdr. Tom Harry England, D.S.C., R.N., youngest son of Mr. and Mrs. George England, Oakdene, Walton-on-Thames, was married to Doreen, eldest daughter of the late Lt.-Col. A. N. Carr, Indian Army, and Mrs. Drinan, 4, North Court Mansions, East Twickenham, by the Rev. Cyril P. Wix.

News has reached Southampton that Flt. Comdr. Moon, R.N., who at the beginning of this year was taken prisoner by the enemy in German East Africa, has rejoined the British Forces, presumably as a result of the recent operations in that country.

At the beginning of the year he was reported killed in action, but it was subsequently ascertained that his seaplane, which also carried Comdr. Bridgman, R.N., D.S.O., fell into Mbumi River owing to engine failure. Flt. Comdr. Moon and his companion burned the machine, and Flt. Comdr. Moon subsequently swam across the river, which was swarming with crocodiles, with a view to finding a boat. They eventually constructed a raft with old window frames and planks, but were carried out to sea and endured great hardships. A storm sprang up, and time after time Comdr. Bridgman, who was in a state of extreme exhaustion, was washed off the raft and as often rescued by Flt. Comdr. Moon. He eventually died, and with the turn of the tide the raft was washed to land. Flt. Comdr. Moon scrambled on shore in enemy territory, his face, hands, and feet being lacerated by the rocks. Flt. Comdr. Moon gained a D.S.O. earlier in the campaign for "great coolness and resource on all occasions."

MILITARY.

G.H.Q. Communiqués.

Nov. 27th, 9.27 p.m.—On the 26th instant the weather was slightly better for flying, but low clouds and a strong wind again hindered work in the air.

Some successful artillery work was done by our aeroplanes, and many photographs were taken. Enemy troops, batteries, and transport were constantly attacked by our low-flying machines.

During the day bombs were dropped on the crossings over the River Sensée and on railheads near Cambrai and north of Douai. At night Douai station was attacked, and bombs were also dropped at Somain station and sidings. Over three tons of bombs were dropped in all.

A few fights took place, in which one hostile machine was brought down and four were driven down out of control. Another hostile machine was shot down by fire from the ground.

None of our aeroplanes are missing.

Nov. 28th.—On the 27th inst., although there was a very high wind, with rain, most of the day, a few important reconnaissances were carried out successfully by our aeroplanes. A little artillery work was done also, and the enemy's troops in their trenches were engaged with machine-gun fire from the air.

During the night, in boisterous weather, over a ton of bombs were dropped on Menin railway station.

One of our machines is missing.

Nov. 29th, 9.25 p.m.—On the 28th instant there was a slight improvement in the weather, the visibility at times being good, but a very strong west wind and clouds interfered with the co-operation of our aeroplanes with the artillery as well as with reconnaissance work.

A number of photographs were taken, and over 130 bombs were dropped during the day on Courtrai, Roulers, Menin, and Thourout railway stations, and on other targets in the Ypres battle area. At night, in spite of the strong wind and clouds, 17 heavy bombs were dropped on Roulers railway station, and many rounds were fired from machine-guns into the enemy's huts in the neighbourhood.

One hostile machine was driven down out of control.

Three of our aeroplanes are missing.

Nov. 30th, 9.37 p.m.—On the 29th instant there was a distinct improvement in the weather, and a full day's flying was possible.

Work with the artillery was successfully carried out by our aeroplanes, many photographs were taken, and several thousand rounds were fired into the enemy's infantry from low heights.

During the day 180 bombs were dropped on a large ammunition dump north of Cambrai, on Roulers railway station, and on hostile billets in the battle area.

Enemy aircraft were very active, attempting to interfere with our artillery and photographic machines.

In air fighting, five hostile machines were brought down and two were driven down out of control. Another hostile machine was shot down by machine-gun fire from the ground.

Three of our aeroplanes are missing.

Dec. 1st, 9.30 p.m.—On Nov. 30th, clouds were at a height of 2,000 ft. all day, but our aeroplanes were out continuously co-operating with the other arms in the counter-attacks against the enemy south-west of Cambrai.

Our artillery machines, in addition to registering our guns, located and reported over 200 hostile batteries.

The bombing machines concentrated their efforts on troops and transport collected in the villages in rear of the battle, dropping over 200 bombs. The enemy's troops and transport moving on roads behind the fighting also offered good targets to our scout pilots, who fired over 15,000 rounds at them from their machine-guns.

The fighting in the air was very severe, and resulted greatly in our favour. Fifteen hostile machines were brought down and three others were driven down out of control.

Seven of our machines are missing.

Dec. 2nd, 9.15 p.m.—On the 1st instant, in spite of the clouds and mist, which rendered flying almost impossible, several reconnaissances of the areas in rear of the battle fronts were carried out successfully by our aeroplanes.

Over 60 bombs were dropped, and many rounds were fired with machine-guns from the air at columns of the enemy's infantry on the road. During the night bombs were dropped on Roulers station.

Only a few combats took place, in which two hostile machines were brought down. Another hostile machine was compelled to make a forced landing and struck the ground in a shell crater.

One of our machines is missing.

Dec. 3rd, 9.2 p.m.—On the 2nd instant, in spite of a very strong north-west wind, our aeroplanes were active reconnoitring the enemy's new positions and observing for our artillery. Many bombs were dropped and machine-guns fired from a low height on villages occupied by the enemy's reserve troops north of Bourlon.

The enemy's active batteries on the Ypres battle front were also engaged with machine-gun fire and bombs.

Hostile aircraft activity was slight, and few fights took place. One German machine was brought down.

Five of our aeroplanes are missing.

War Office Communiqués.

Nov. 30th.—The G.O.C. the British Forces in Palestine reports:—

In an air encounter five hostile aeroplanes attacked three of our machines; one Turkish machine was driven down out of control and one damaged.

Dec. 2nd.—The G.O.C. the British Forces in Palestine reports:—

Bombing raids were successfully carried out on Tul Keram, an important junction on the Turkish line of communications (10 miles west of Samaria and 23 miles north-east of Joppa). About a ton of bombs was dropped on the camp, railway, anti-aircraft batteries, and aerodrome.

The Casualty List.

• Reported Nov. 28th.

Died of Wounds.—Bakewell, Sec. Lt. G. J., R.F.C.
Barnett, Sec. Lt. W. A., R.F.C.
Hemming, Sec. Lt. W. N., R.F.C.
Stone, Sec. Lt. H. J., R.F.C.

Wounded.—Elder-Hearn, Sec. Lt. T., R.F.C.
Wickenden, Sec. Lt. C. R. F., R.F.C.

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Missing.—Henry, Sec. Lt. S. S., R.F.C.
Leach, Lt. J. M., Yorks R., attd. R.F.C.
Mayberry, Lt. R., R. Sco. Fus., attd. R.F.C.
Morgan, Sec. Lt. T. P., R.F.C.
Previously reported Missing, now reported Died of Wounds as a Prisoner in German Hands.—Chapman, Sec. Lt. L. C., R.F.C.
Previously reported Missing, now reported Prisoners in German Hands.—Park, Sec. S. M., R.F.C.
Ortweiler, Sec. Lt. F. J., R.F.C.
Wookey, Sec. Lt. H. C., Glouc. R., attd. R.F.C
Prisoner in Turkish Hands.—MacRae, Lt. J. D. G., Sea. Highrs., attd. R.F.C.

Reported Nov. 29th.

Wounded.—Brewer, Sec. Lt. E., R.F.C.
Previously reported Prisoner, now reported Wounded and Prisoner in German Hands.—Casey, Lt. P. J., R.F.C.

Reported Nov. 30th.

Killed.—Cutler, Sec. Lt. W. R., R.F.C.
Halligan, Lt. M., R. Dub. Fus., attd. R.F.C.
Hardie, Sec Lt. D. W., R.F.C.
Waters, Sec. Lt. J. P., R.F.C.
Died of Wounds.—McLaren, Sec. Lt. W. S., R.F.C.
Wounded.—De Belabre, Sec. Lt. V. M., North'd Fus., attd. R.F.C.
Missing.—Cranswick, Sec. Lt. G. A., Y. and L. Regt., attd. R.F.C.
Previously reported Missing, now reported Prisoners in German Hands.—Nash, Sec. Lt. F. M., R.F.C.
Scholtz, Sec. Lt. E., R.F.C.
Watts, Sec. Lt. W. E., R.F.C.
Yeomans, Sec. Lt. F. L., R.F.C.
Australian Force.—Wounded.—Johnson, Lt. C. L., Flying Corps.
Canadian Contingent.—Wounded.—Creaghan, Lt. T. C., W. Ont. R., attd. R.F.C.
Previously reported Missing, now reported Prisoners in German Hands.—Godard, Lt. J. S., Eng., attd. R.F.C.
Long, Lt. G. R., Man. R., attd. R.F.C.

Reported Dec. 1st.

Killed.—Davey, Sec. Lt. W. C., A.S.C., attd. R.F.C.
Hall, Capt. D. S., M.C., Arg. and Suthd. Highrs., attd. R.F.C.
Died of Wounds.—Booth, Sec. Lt. J. T., R.F.C.
Darrington, Lt. H. E., Mx. R., attd. R.F.C.
Phear, Sec. Lt. N. C., R.F.C.
Wounded.—Cayley, Sec. Lt. P. J., Glouc. R., attd. R.F.C.
Fish, Capt. W. R., R.F.C.
Hitchcock, Capt. G. E. W., R.E., attd. R.F.C
Kennedy, Sec. Lt. C. E., R.F.C.
Lane, Sec. Lt. D. W., R.F.C.
Mayoss, Sec. Lt. W. F., R.F.C.
Robertson, Lt. H. S., R.F.C.
Rogers, Sec. Lt. E. C., R.F.C.
Missing.—Angus, Lt. R. E., Yeo., attd. R.F.C.
Australian Force.—Killed.—Pilkington, Sec. Lt. S. H., Fl. Corps.
Wounded.—Blair, Sec. Lt. J. R., Fl. Corps.

Reported Dec. 3rd.

Killed.—Cook, Capt. A. B., R.F.C.
Coppard, Sec. Lt. S. B. H., R.F.C.
De Lisle, Lt. A. C. N. M. P., R.F.C.
Gates, Sec. Lt. H. J., Buffs, attd. R.F.C
Hartigan, Sec. Lt. E. P., R. Mun. Fus., attd. R.F.C.
Died of Wounds.—Horsfall, Sec. Lt. G. R., R.F.C.
Wounded.—Bell, Capt. J., R.F.C.
Coleman, Sec Lt. J. P., R.F.C.
Hooper, Sec. Lt. R. B., R.F.C.
Smith, Sec. Lt. J. K., Lan. Fus., attd. R.F.C
Williams, Lt. L. B., R.F.C.
Wolton, Capt. R. N., R.F.A., attd. R.F.C
Missing.—Hall, Sec. Lt. G. W., R.F.C.
Higginson, Sec Lt. W. C. V., R.F.C.
Kent, Sec. Lt. T. J., R.F.C.
Ledger, Sec. Lt. H. P., R.F.C.
Meredith, Sec Lt. O. W. W. H., R.F.C.
Stead, Sec. Lt. M. W. B., R.F.C.

Reported Dec. 4th.

Killed.—Elliott, Lt. E. C. J., R.F.C.
Jones, Sec. Lt. H. E., R.F.C.
Weiss, Sec. Lt. E. S., R.F.C.
Whitehead, Sec. Lt. R. M., R.F.C.
Previously reported Missing, now reported Killed.—Holroyde, Sec. Lt. J. S., E. Yorks R., attd. R.F.C.
White, Sec. Lt. J. G., Sco. Rif., attd. R.F.C.
Wounded.—Cushny, Sec. Lt. J., R.F.C.
Groome, Sec. Lt. E. D. S., R.F.C.
McCulloch, Sec. Lt. W. A., R.F.C.
Moloney, Sec. Lt. P. J., R.F.C.
Phelps, Sec. Lt. L. H., Linc. R., attd. R.F.C.
Thomas, Sec. Lt. E., R.F.C.
Wallis, Sec. Lt. F. C., Worc. R., attd. R.F.C.
Watson, Sec. Lt. F. L., R.F.C.
Previously reported Missing, now reported Missing, Believed Killed.—Barton, Sec. Lt. C. H., R.F.C.
Marvin, Sec. Lt. H. L., R.F.C.
Missing.—Atkinson, Sec. Lt. T. L., R.F.C.
Crole, Capt. G. B., M.C., R.F.C.
Marchand, Sec. Lt. E. F., R.F.C.
Previously reported Prisoners, now reported Died of Wounds as Prisoners in German Hands.—Guy, Capt. C. G., North'n R., attd. R.F.C.
McDonald, Lt. K. W., R.E., attd. R.F.C
Previously reported Missing, now reported Prisoners in German Hands.—Turvey, Sec. Lt. A. E., R.F.C.
Winter, Sec. Lt. W. H., R.W. Surr. R., attd. R.F.C.

* * *

Casualties among N.C.O.'s and Men.

The dates are those of the official list.

Killed.

Nov. 19th.—R.F.C.—Gardner 67427 2nd Cl. Air Mech. C. I (Camberwell, S.E.; McNeil 106015 3rd Cl. Air Mech. D (Edinburgh).

Died.

Nov. 24th.—R.F.C.—Weaver 405307 1st Cl. Air Mech. W. A (Taunton).

Wounded.

Nov. 19th.—R.F.C.—Bate 44974 2nd Cl. Air Mech. H. V. (Hull) Bock 30221 Sjt. G. A. (Battersea, S.W.); Boyce 8980 1s Cl. Air Mech. F. W. (Bristol); Darling 9155 1st Cl. Ai Mech. S. E. (Bermondsey, S.E.)); Goodger 10098 1st C Air Mech. G. L. (Croydon); Hazlewood 106252 3rd Cl. Ai Mech. B. (Leeds); Hill 7984 1st Cl. Air Mech. A. R (Birmingham); Hill 11927 2nd Cl. Air Mech J. (Mar chester); Kilgallon 106001 3rd Cl. Air Mech. T. (Hudder field); Nicholls 58198 3rd Cl. Air Mech. F. W. (Londo S.W.); Purchase 44252 2nd Cl. Air Mech W. H. (Clapha Park, S.W.); Woffendale 12663 1st Cl. Air Mech Z. W. W (Shepperton).
Nov. 21st.—Wand 8201 1st Cl. Air Mech. P. C. (New Zealand
Nov. 22nd.—Beal 47459 2nd Cl. Air Mech C. G. (Farnham) Clifford 66339 2nd Cl. Air Mech F. J. (Stourbridge); Newto 36779 2nd Cl. Air Mech S. (Stroud Green, N.).
Nov. 24th.—Woodhouse 37316 1st Cl. Air Mech. A. J. (Hereford

Missing.

Nov. 19th.—R.F.C.—Benger 88288 Sjt. W. J. (Ewell); Cle 7124 Sjt. H. L. (Bowes Park, N.).
Shropshire Light Infantry, attd. R.F.C.—Johns 102 F. J. (Hereford).

Australian Imperial Force.

Killed.

Nov. 24th.—A.F.C.—Russon 317 B. G. ...

PERSONAL NOTICES.

Deaths.

BUSH.—Capt. J. S. de Lisle Bush, Somerset L.I., attache R.F.C., who was reported missing on August 25th, is official declared killed on that date, over the enemy lines, aged 21. Ca Bush received his commission in July, 1913, and went to t front with the regimental drafts in August, 1914. He was pr sent at the Battles of the Marne, Aisne, and Ypres in Nove ber, 1914, where he was severely wounded. He rejoined t regiment at the front early in 1915. He was transferred to t R.F.C., in 1916, and obtained his "wings" last May. He w the youngest son of Mr. and Mrs. George de Lisle Bush, Eastington Park, Gloucestershire, and was educated at Pa Hill, Lyndhurst, and Cheltenham College.

CUNNINGHAM.—An inquest was held on Nov. 30th, on t body of Sec. Lt. J. Crawley Cunningham, R.F.C., who died hospital on Nov. 28th, as the result of an aeroplane accide From the evidence it appeared that Mr. Cunningham was ma ing his final test before being passed for service oversea. making a turn he came into collision with some trees. T aeroplane took fire, and he was so badly burned that he died hospital a few hours later.

The jury returned a verdict of "Accidental death," a warmly commended ex-Inspector Harry Smith, late of t Metropolitan Police, for his bravery in trying to drag the o cer from the burning machine. Mr. Cunningham was 19 yea of age.

DE GREY WARTER.—Capt. Henry de Grey Warter, D goon Guards, aged 31, who was killed in action on Nov. 20 was the only son of the late Col. and Mrs. de Grey Warte R.H.A., and husband of Vera de Grey Warter, Apsley Cottag near East Grinstead.

Though not an R.F.C. officer during the war, Capt. de Gr Warter will be remembered as one of our earliest military avi tors. He took his certificate, No. 107, dated July 18th, 1911,



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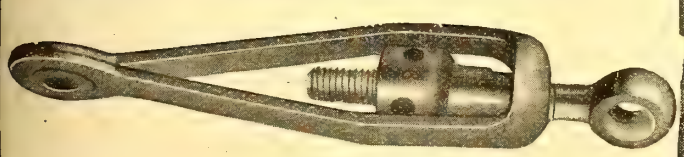
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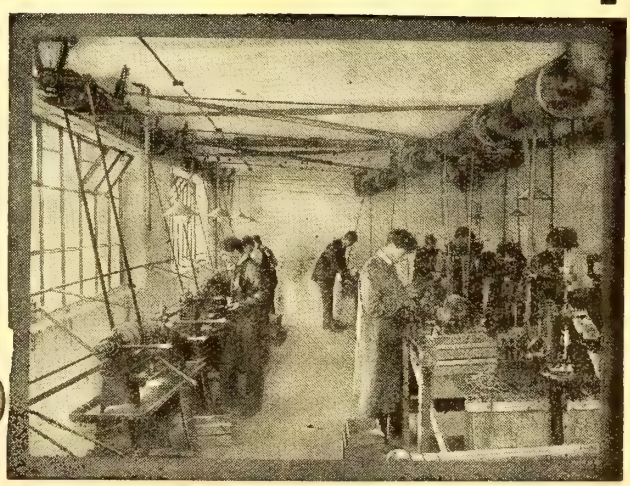
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He was gazetted from the Reserve of Officers for active service, and had his captaincy in November, 1916.

DE LISLE.—Lt. Alexander C. N. March Phillippe de Lisle, R.F.C., was killed while flying on Nov. 20th, in his 21st year. He volunteered for service at the beginning of the war, and obtained a commission in the Leicester Regt. when he was 17 years old. He went to France in June, 1915, and returned home, having been wounded in a bombing raid at Bienvillers. He was recommended for gallant and distinguished conduct in the field by his Divisional Commander. He returned to the front in June, 1916, and was severely wounded on July 14 while leading a bayonet charge. In December he joined the R.F.C., and gained his wings last July. He went to the front again in August. Mr. de Lisle was the fifth and youngest son of Mr. Edwin de Lisle, M.P. for Mid-Leicestershire, 1886-92, and grandson of Mr. Adrian Elias Hope, and was educated by the Jesuit Fathers at Beaumont College, Old Windsor.

DIXON.—Lt. C. R. Dixon, R.F.C., who was killed in action on Nov. 28th, was the son of Mrs. Dixon, 13, Granville Road, Stroud Green. He was 22 years of age.

ELLIOTT.—Lt. Eric Cuthbert John Elliott, Essex Regt., attached R.F.C., who was killed in action on Nov. 22nd, was the youngest son of Mr. and Mrs. Clifford Elliott, Beulah Hall, Clapham Park, and Smyrna, Turkey.

GUY.—Lt. Christopher Godfrey Guy, Northamptonshire R. and R.F.C. (formerly temp. Capt.), who died of wounds on Aug. 12th, was the only son of the Rev. and Mrs. F. Godfrey Guy, 38, Christchurch Road, Bournemouth. He was 23 years of age.

HEATHCOTE.—Sec. Lt. W. Godfrey Heathcote, R.F.C., killed on Nov. 23rd, aged 19, was the elder son of Mr. and Mrs. Godfrey Heathcote, of Arnside, Westmorland, and was educated at The Wells House, Malvern Wells, and at Blundell's School. He received his commission last May and had been at the front since Sept. 5th.

PORTER.—Major John Grey Archdale Porter, D.S.O., Lancers, eldest son of Mr. John Porter Porter, of Belle Isle, Lisbellow, Ireland, has died of wounds received in action. Born in 1886, he was educated at Harrow, and received his first commission in 1906. Wounded at Mons and again in the following year, he was awarded the D.S.O. for conspicuous bravery in the field. In 1916 he returned to England for a course of flying, but after obtaining his wings rejoined his regiment at the front, and at the time of his death was second in command.

WEISS.—Sec. Lt. Edward Stanley Weiss, R.F.C., who was killed in action on Nov. 22nd, was the youngest son of Samuel Samuel and Louise Weiss, of 167, Willesden Lane, N.W. He was 20 years of age.

WYLIE.—Sec. Lt. Alan Lindsey Wylie, M.C., R.F.C., who was killed in action on Nov. 20th, was 22 years of age, and the younger son of Mr. J. G. Wylie, well known in the football and athletic world during the late 'seventies. At the outbreak of the war he was in Canada, but at once hastened home and enlisted in the P.S. Battalion R.N.D., with which he saw service in Gallipoli. He was then granted a commission in the R.F.A., and was sent to France. While attached to a trench mortar battery he was awarded the Military Cross, in Dec., 1916, for "great courage and resource." He joined the R.F.C. in the summer of 1917. Mr. Wylie was mentioned in dispatches in Jan., 1917, for "gallant service and devotion to duty."

Engagements.

BARTLETT—DAVIS.—The marriage of Lt. W. A. Bartlett, Lincolnshire Regt. and R.F.C., and Frances Mary, daughter of Mr. and Mrs. Davis, Holly House, Goudhurst, will take place quietly in London early this month.

COPNER—FLORIZOONE.—A marriage will take place shortly at Petersfield between Lt. Eric Copner, the Devonshire Regt. and R.F.C., only surviving son of the late Arthur L. Copner, and Paula, daughter of the late Maître Florizoone, barrister, of Bruges.

MILLER—DAMS.—The engagement is announced of Francis Justin Miller, Captain, Royal Flying Corps, second son of Mr. and Mrs. A. P. Miller, of Stone, Staffs, and Dorothy Margaret, second daughter of the Rev. and Mrs. A. E. Dams, the Vicarage, Goring-on-Thames.

Marriages.

BOURNE—BAYLOR.—On Nov. 29th, at St. Matthew's Church, Ipswich, Lt. Geoffrey Campbell Bourne, London Regt. and R.F.C., was married to Eileen Mary, younger daughter of Dr. and Mrs. Edward Baylor, North Lodge, Ipswich, by the Rev. C. W. Bourne, father of the bridegroom, assisted by the Rev. R. S. Lovell, uncle of the bride.

DRYSDALE—MITCHELL.—On Nov. 24th, at the Church of the Holy Innocents, South Norwood, S.E., Capt. J. Douglas Drysdale, R.F.C., eldest son of Mr. and Mrs. J. W. Drysdale, of South Norwood Hill, S.E., was married to Ivy, youngest daughter of Mr. and Mrs. R. W. Mitchell, of "Steynsdorp," Anerley, Kent.

Births.

GOULBURN.—On Nov. 30th, 1917, at Harrow-on-the-Hill, to Marguerite, the wife of Tom Goulburn, Captain R.F.C., a daughter.

ELLIS.—On Nov. 30th, at The Firs, Sudbourne, Suffolk, the wife of Capt. H. E. O. Ellis, M.C., R.E. and R.F.C., of a son.

LEIGH.—On Nov. 26th, at 15, Drayton Gardens, S.W., the wife of Capt. Leigh, R.F.C.—a son.

If any officer or man can give any information, or if relatives of prisoners of war in Germany would ask for news, of Lt. L. V. Gray, 1st C.M.R., attd. R.F.C., who was reported missing on August 16th, such information would be most gratefully received by his wife at "Mhow," All Saint's Avenue, Margate.

FRANCE.

Official Communiqués

Nov. 27th.—Army of the Orient.—British aviators have been active. On the 26th they bombed the railway station at Drama and the neighbourhood of Seres (both on the Struma front).

Nov. 28th.—Army of the Orient.—In the region of Monastir an enemy aeroplane was brought down by our machine-gun fire.

Nov. 30th.—Army of the Orient.—French aviators carried out several bombardments in the valley of the Vardar and to the north of Monastir. Three enemy machines were brought down, two by British aviators and one by French artillery.

Dec. 1st.—Army of the Orient.—British aviators bombed the region of Rupel and the railway from Drama to Seres.

Dec. 2nd.—Army of the Orient.—British aviators have dropped bombs on Hudovo, in the Vardar valley.

GERMANY.

Official Communiqués.

Nov. 30th.—In aerial engagements and by fire from the ground our opponents have lost 30 aeroplanes and two captive balloons. Lt. Buckler gained his 30th aerial victory, Lt. Bongartz his 25th, Lt. Boehme his 24th, and Lt. Klein his 21st.

Dec. 1st.—Capt. Baron von Richthofen and Lt. Klein have respectively secured their 63rd and 22nd aerial victory.

Dec. 3rd.—In the last three (? days) our opponents have lost in aerial fighting and by gunfire from the ground 27 aeroplanes and two captive balloons.

Lt. Müller obtained his 35th aerial victory. Lt. von Bülow his 27th and 28th, and Lt. Bongartz his 25th and 26th.

ITALY.

Official Communiqués.

Nov. 28th.—On the Asiago Plateau, in the Primolano basin (Brenta), at the north of the Col della Berretta (east of San Marino), and on the Middle Piave, our batteries, in co-operation with bombardment flights, have carried out concentrations of fire on the enemy troops massed and in movement.

Four enemy aeroplanes were brought down or forced to land by our aviators.

Nov. 30th.—Above Asiago an enemy aeroplane was brought down in an air combat. Last night enemy encampments between Feltre and Fonzaso were effectively bombarded by our machines.

Dec. 1st.—Our aviators were intensely active. Enemy encampments in the hollow of Arten (2½ miles west of Feltre) were bombarded and three enemy machines were brought down in aerial duels. One captive balloon was set on fire and another forced to land.

* * *

Mr. G. Ward Price, writing from Venice on Nov. 29th, of the Italian retreat, says:—

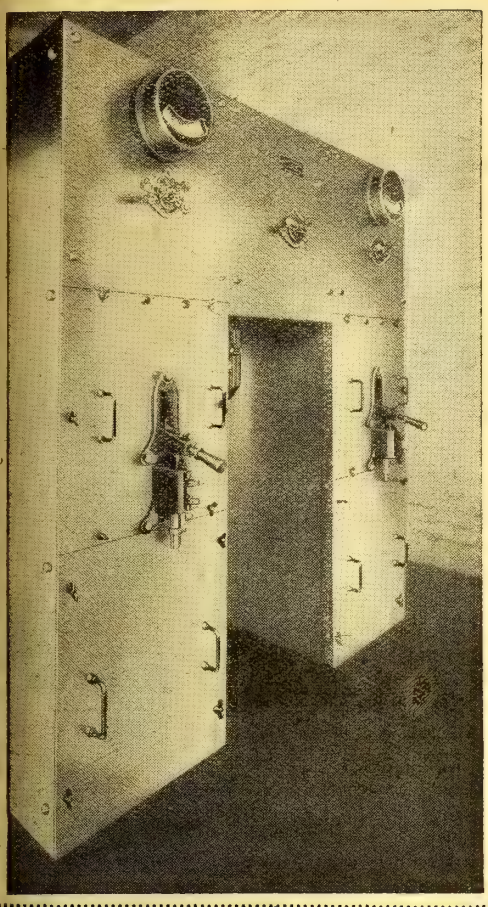
Hardly a day passes without enemy aeroplanes making an attack upon the Italian observation balloons above them. Two contrived to get within striking range earlier this week by an ingenious trick. They approached firing at each other and going through all the manœuvres of an aeroplane duel. Until they had come close enough for the shape of the machines to be clearly seen the Italian look-outs naturally mistook them for an Austrian aeroplane being attacked by an Italian. The enemy machines were able in this way to get close to the observation balloon without being molested. Then the stratagem was discovered and the balloon began to be quickly hauled down. It would have been saved if the winding-gear had not unfortunately jammed, with the result that the enemy aviators were able to set fire to it.

TURKEY.

Official Communiqués.

Nov. 28th.—An enemy aeroplane dropped bombs upon Gallipoli, injuring a woman and two children.

Nov. 30th.—A British captive balloon was brought down by



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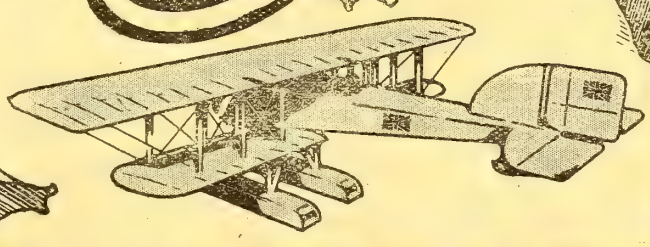
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ROUMANIA.

Official Communiqué.

Nov. 27th.— On Nov. 23rd as the result of an aerial battle between three enemy aviators and three of our own men, one enemy machine was brought down by Lt. Craeu and Lt. Nasta in the region of Mandresti. During the course of the same battle Pilot Plutonnier Muntenescu, seriously wounded, fell with his machine whilst trying to land near Tecuci.

BULGARIA.

Official Communiqué.

Nov. 30th.—After an air fight the German Serjt.-Maj. Lage brought down an enemy aeroplane, which fell behind our positions south of Stoikovo.

HOLLAND.

According to the "Nieuwe Rotterdamsche Courant," a German aeroplane landed near Zesgehuchten, in the Dutch province of North Brabant, on Dec. 1st, and the occupants have since been interned.

COMMERCIAL AERONAUTICS.

On Nov. 28th an extremely interesting lecture on Commercial Aeronautics was delivered to the Society of Arts by Lt.-Col. Mervyn O'Gorman, C.B. Sir Charles Parsons, who presided, said that in 1887 he believed flying to be possible with a steam engine, but for the water problem and the impossibility of carrying the weight of a condenser.

Col. O'Gorman said that he was really delivering this lecture in place of Mr. Holt Thomas, who was away ill, and therefore it was prepared at very short notice. Mr. Holt Thomas had found that his lecture to the Aeronautical Society some months ago seemed to have given a general impression that mail and passenger services would create a great aeroplane construction scheme which would keep the Trade going after the war. Mr. Holt Thomas desired it to be understood that he never said or thought this. The weight of mails would be small and the life of an aeroplane in the hands of a commercial firm would be long. So there was nothing to indicate that a great construction scheme immediately after the war would be necessary. Aircraft firms would therefore be unwise to rely on the prospects of such business.

Col. O'Gorman then pointed out the wisdom of considering the future uses of aircraft, and said that it was unjust to say that such commercial considerations to-day would detract from present war activities. It was in fact in the interests of war to think of commerce after the war. We must maintain in peace an industry capable of building an Air Fleet eight times a year during the war to make up for wastage. If aeroplane orders were to stop suddenly at the end of the war the Aircraft Industry must die in a few months. Therefore the Industry must be nursed and aeroplanes must be used so as to earn their keep. Something must be done to bridge the hiatus between war activity and the growing of a peace industry.

He recalled that the railway and steamboat had struggled against public apathy and from an excess of legislation; the motor-car had suffered from legislation which killed it in 1837, and kept it behind France when reborn in 1892. Legislation had kept the dynamo in this country behind Germany. We were so afraid of accidents in this country that we legislated against them for all new industries and killed the industries, although we allowed a dog one bite before he was killed as dangerous. Technical legislation had hampered and not helped in this country.

Our mercantile marine fleet before the war did not cost a third of what our air fleets were costing during the war, so we must provide for future air fleets. International agreements were long-drawn-out affairs, but it was little to ask the Foreign Offices of the world to consider now aeronautical agreements for the future.

Touching on the labour question Col. O'Gorman said that it was hoped that peace would institute a new spirit of harmony. It was well to realise therefore that there would be a shrinkage in the labour employed on aircraft after the war. Men would be paid off instead of hundreds of thousands being added, and it would be wise to take steps accordingly.

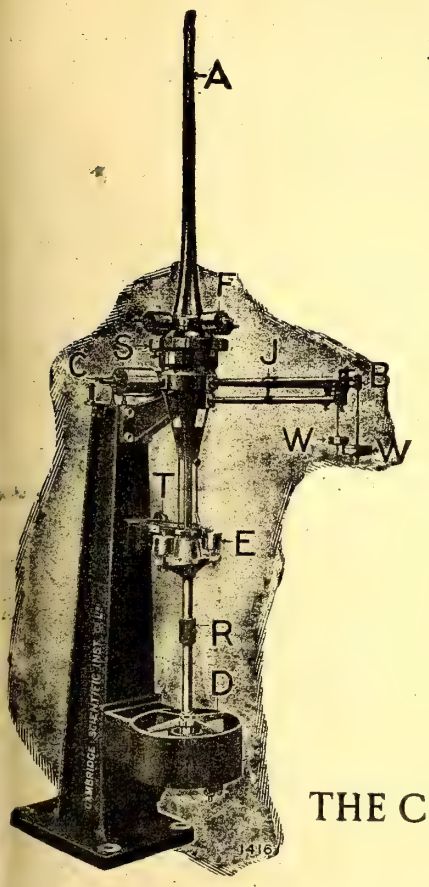
On the subject of safety in flying he said that most accidents were due to the absence of easily reached landing ground or to the ignorance or carelessness of pilots. The most astonishing thing was the enormous number of machines broken without killing a man. In peace time safety would be greatly increased because of the less exacting performances required from machines and pilots. Lack of contact between the public and aviation was the reason for wrong ideas held on the dangers of flying.

Referring to research work Col. O'Gorman said that it cheapened production. Blunders by unskilled persons did not detract from the value of the wind tunnel. There were two

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sorts of research: one comprising experiments for quick results and for proprietary purposes, and the other for eventual improvements and in the general interest. The former was the more tempting class financially, but for the ultimate good of aeronautics steps should be taken to encourage the latter kind of experiment, and help should be given by the S.B.A.C. and the Civil Aerial Transport Committee.

Sociological as well as technical education would assist progress. It was necessary to destroy the idea that restricting production could make anyone wealthy. On the subject of aerial transport he suggested that older types of aeroplanes and war-worn pilots should be told off to experiment with air routes for papers and mails. Such experiments now would help to establish such routes quickly after the war. He agreed with Mr. Holt Thomas that machines doing 120 m.p.h. would be necessary to compete with railways over direct routes, but that less would do for cross-country routes. Finally Col. O'Gorman remarked that in war one must prepare for the cataclysm of peace.

Major Heckstall Smith agreed as to employing pilots and machines immediately in experiments over postal routes. France was already doing it. People in the Aircraft Trade were naturally afraid of peace, so they were already looking for other branches of engineering to keep them going after the war. This was bad for future development and led to diverting thought from aircraft work. The new Civil Aerial Transport Committee should do something to settle prospects for the future.

Capt. Swinton inquired as to what the rate of depreciation on aeroplanes would be in commercial use, and suggested that possibly the money value of the depreciation would be greater than the cost of fuel over a given time.

Mr. Reid advocated the establishment in time of peace by commercial aircraft users of a compensation fund for their victims on the ground on the lines of the chicken funds run by hunts, and remarked that there would be doubtless plenty of claims on such a fund. He hoped that after the war aeronautics would be controlled by a capable Government Department, and would not be governed by a lot of flappers in an office.

SALES OF MAHOGANY.

With reference to the Board of Trade Order of Aug. 24th last relating to stocks of mahogany and American walnut the Controller of Timber Supplies announces that following on the notification which appeared on Sept. 7th the restriction on sales of all kinds of mahogany is withdrawn until further notice.

DISLOYAL WORKERS.

An official statement, issued on November 28th, stated that the strike at Coventry, which has so seriously retarded the output of aircraft, and thereby interfered with the whole of the Government military programme, still continued in spite of the fact that the employers had offered to meet the men's trade union representatives as soon as work was resumed.

The unions principally concerned had discountenanced the strike, and advised the men to return to work in order that the question at issue might proceed to a conference with the employers in accordance with the agreement which is in existence between them for the purpose of dealing with trade disputes.

The Mayor of Coventry had issued an appeal on Nov 28th to the workers to be "loyal soldiers in the munition shops," but neither the men nor the employers were prepared to yield ground.

The trouble originated in the factory of Messrs. White and Poppe, makers of aeroplane engines. The chief demand of the men was that the shop stewards, instead of the trade union officials, should be allowed to negotiate with the employers.

"In Coventry," Mr. Poppe said, "the Employers' Federation does not deal with shop stewards. I am always prepared to see deputations of my men on small matters, or to deal with the unions on important affairs. We employ 6,000 women here. They have been splendid. We have been able to keep half of them at work during the day."

Mr. J. Read, Secretary of the Coventry Engineering Joint Committee, to which 16 trade unions are affiliated, stated that the men would stay out until they got what they want.

Many of the large firms were unable to pay their workers as their clerical staffs had not been allowed to enter the factories. The Daimler, Humber, and Swift Cycle Companies had each issued notices regretting the impossibility of making out paysheets.

Sir William Weir, Controller of Aircraft Supplies, said in an interview: "I cannot but regard this stoppage of work as very grave in its results. For many months the nation as a whole has been calling for an invincible Air Service. To provide such a Service quickly requires an immense effort, an effort analogous to that initiated by the Prime Minister when he started the Ministry of Munitions. As a matter of fact, time is even more precious now than it was then, for the problem of increasing our aeronautical supplies is much more complex than the problem which the Ministry had to face two years ago, and a stoppage of

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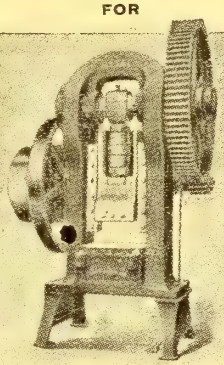
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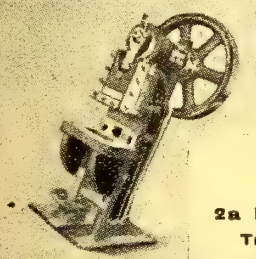
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work in any one of the many industries involved is sufficient to retard the whole of our constructional programme."

After a lengthy conference, when Mr. G. N. Barnes, M.P., and Lt.-Gen. J. C. Smuts met representatives of the Engineering Employers' Federation and officials of the Coventry and District Engineering Employers' Federation, and also representatives of the Executive of the trade unions of the Coventry Engineering Trade Joint Committee and of the men's council, the following agreement was signed:—

Provided that the men resume work on Tuesday, Dec. 4th, immediately after breakfast, in accordance with the recommendations of the representatives which will be made. Further local conferences will be arranged to meet on the same day to open negotiations on all points in dispute.

The employers and the workmen will approach the situation with a desire to secure a satisfactory conclusion. The Government on their part will urge upon the Employers' Federation and the trade unions' executive the necessity of an immediate settlement, among other general questions affecting the relationship between the employers and the trade unions, of that of the position of the shop stewards in relation to both.

Both parties agree that there shall be no victimisation as a result of the dispute on either side.

On Dec. 2nd Coventry was bombarded from the air by low-flying aeroplanes with handbills pointing out the vital need for an increase in aeroplane production

A helpful mediator was a chaplain of the Royal Naval Air Service. Reading at an aerodrome in France that the strike had broken out, he got leave to come to England to investigate the trouble, and to try to bring about a reconciliation for the sake of the pilots and the soldiers whose lives were at stake.

He crossed the Channel in a seaplane—it was his first experience of aviation—and travelled in the early hours of the morning to Coventry, where he spent the day in hearing the views of both sides and talking to the workers whenever he had an opening. He declared his intention of remaining until he could go back and tell his comrades in France that he had seen the strikers back at their work.

THE LABOUR PROBLEM.

The first meeting of the newly appointed Government Labour Committee, held on Nov. 30th under the chairmanship of Mr. G. N. Barnes, was devoted almost entirely to the consideration of the position of affairs at Coventry. After a statement from Sir William Weir, of the Air Ministry, setting forth the vital necessity of the resumption of aircraft work in Coventry, matters were left in the hands of Mr. Barnes and Mr. I. H. Mitchell.

Two officials were appointed by the Committee to make inquiry and, if in their judgment advisable, to arrange for a great meeting in Coventry. If it can be shown that such a gathering would be appreciated by the workers, it is understood that General Smuts would be willing to address them.

LORD MONTAGU AS MISSIONARY.

Col. Lord Montagu of Beaulieu, C.S.I., has just arrived in Canada where he has gone to lecture on aviation in the principal cities of the Dominion, with the object of stimulating interest in air matters, and especially with a view to obtaining recruits for the R.F.C., both as regards officer-cadets and rank and file.

At the conclusion of his mission, Lord Montagu will proceed to India to resume his official duties there.

THE AIR FORCE BILL IN THE COMMONS.

On Nov. 28th the amendments made by the House of Lords in the Air Force Bill were considered.

Major Baird (Rugby, U.) explained that the only amendments which were not of a purely drafting character were two, which provided that, under regulations made by the Army Council and the Air Council, officers and men of the Air Force acting with any body of the military force on active service might be made subject to military law, and officers and men of the Army on active service with the Air Force might be made subject to the provisions of this Bill.

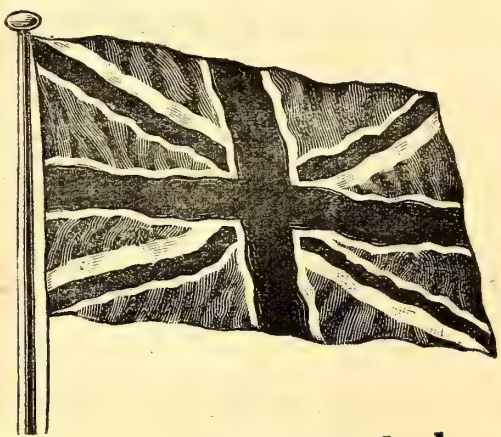
General Sir I. Philipps (Southampton, L.) suggested that it was rather a drastic step to place the lives and discipline of any of the 5,000,000 officers and men of the Army under an entirely new Force not yet properly organised.

Major Baird, in reply, suggested that sufficient protection was afforded by the assent of the Army Council and the Air Council to the regulations being required.

All the amendments were agreed to.

THE N.P.L.

According to the provisions for the future control of the National Physical Laboratory, which have been approved in principle by the Treasury, the property of the institution will be vested in the Imperial Trust for the Encouragement of Scientific and Industrial Research, and the scientific control in the President and Council of the Royal Society. The Executive Committee will be responsible for the management. It is proposed to defer the transfer until the beginning of the next financial year.



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IMPORTANT NOTICE TO ALL ENGINEERING FIRMS ENGAGED ON MUNITION WORK.

INSTITUTE OF

Ophthalmic Opticians.

President: The Rt. Hon. LORD ALDENHAM, M.A.

The attention of all engineering and manufacturing firms engaged on important Munition work, and especially those firms employing a large number of female workers, is directed to the following statement appearing in Memorandum No. 15, entitled "The Effect of Industrial Conditions upon Eyesight," and issued by the Health of Munition Workers' Committee appointed by the Ministry of Munitions:—

"Notwithstanding the important bearing which good eyesight must have upon output, the question is not to-day receiving attention at the hands of those whose duty it is to obtain this output." (par. 5.)

The Institute of Ophthalmic Opticians has, thanks to the patriotic voluntary enrolment of a large number of its members, been able to formulate an Industrial Sight-Testing Scheme, under which it undertakes to provide (voluntarily) qualified Opticians to test the eyesight of factory workers.

N.B.—A qualified Optician is understood to be an ophthalmic optician who has passed either the Sight-Testing Examination of the Spectaclemakers' Company, whose examinations are under the direction of the Rt. Hon. Sir William Hart-Dyke, M.A., and among whose examiners are Mr. H. G. Critchley, M.A., M.D., and other medical men and scientists, or that of the British Optical Association, whose examiners are R. S. Clay, D.Sc., Edwin Edser, A.R.C.S., W. J. M. Ettles, M.D., F.R.C.S., W. W. Haldane Gee, B.Sc., Albert Griffiths, D.Sc., W. J. May, F.R.G.S.

Firms desiring full particulars of this important scheme are requested to write to

Mr. J. HARCOMBE CUFF, Secretary,
Institute of Ophthalmic Opticians,
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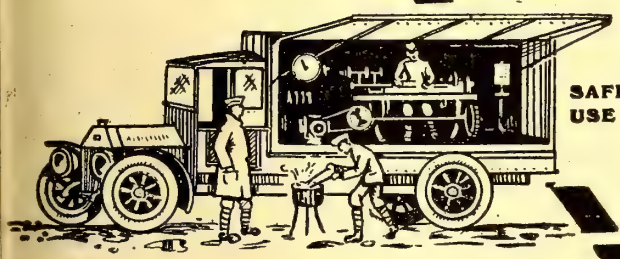
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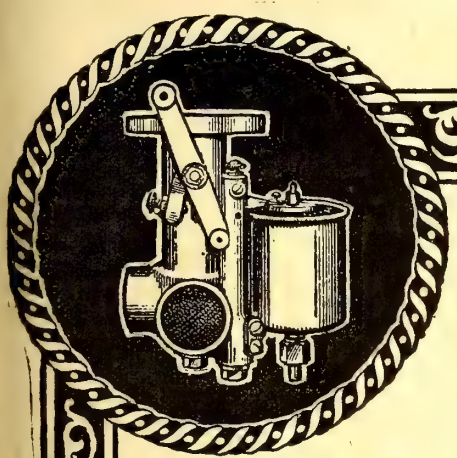


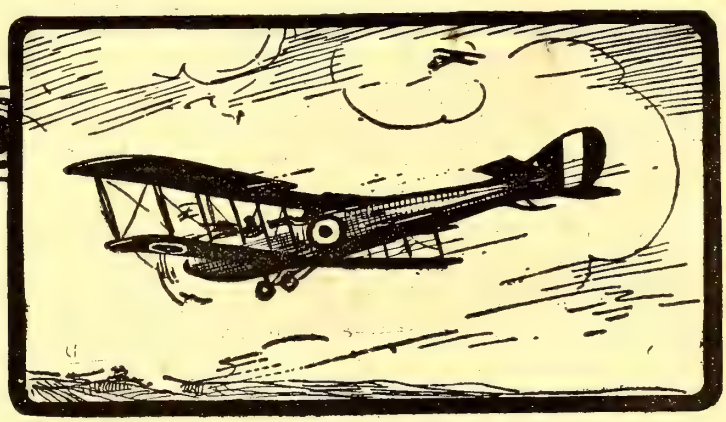
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THE VALUE OF OXYGEN.

It is reported that the Air Board has accepted the aid of the Medical Research Committee, with a view to the solution of important medical problems associated with flying, especially at high altitudes.

Throughout the year Professor Georges Dreyer (hon. Major R.A.M.C.) has been engaged in devising for the Royal Flying Corps in France a special form of apparatus for the supply of oxygen to aviators while in the air, and this has reached practical success.

Captain Martin Flack has made a study of the physiological condition of pilots who are unable to fly at the higher altitudes. He has invented a method for gauging the height at which a pilot or observer is affected by rarefaction of the atmosphere, and therefore the height at which he should be allowed to fly.

Simple tests have been designed to control the admission of candidates likely to suffer from fainting or other disability in flying. A further series of experiments to show the value of oxygen in relieving fatigue has been carried out.

ITALIAN AIRSHIP IMPROVEMENTS.

The Italian Press publish the fact that the new Forlanini airships attain an altitude of 5,610 metres, a matter of well over 18,000 ft., quite an astonishing height for a comparatively small airship. As usual, I.F. motors are used. It appears that the Italians are still keeping their prominent position as regards small and medium-sized airships.

THE COTTON TRADE AND AIRCRAFT CONSTRUCTION.

On Nov. 28th a deputation of masters and operatives in the Lancashire cotton industry was received by Mr. G. H. Roberts, Minister of Labour, to discuss the question of adapting weaving

The Supply of "The Aeroplane."

Complaints are being received continually concerning the difficulty of obtaining THE AEROPLANE from newsagents and bookstalls. Owing to shortage of paper it has been necessary to discontinue the practise of supplying newsagents with an unlimited number of copies of this paper on the "sale or return" principle, consequently it is impossible for the bookstalls and papershops to keep a quantity of copies for chance sales. ¶ Nevertheless, everyone who places a definite order for regular weekly delivery with a newsagent ought to receive a copy with the regular Thursday morning papers. If any difficulty is found in thus obtaining delivery the proprietors of THE AEROPLANE will be glad to hear about it. ¶ Certain newsagents, rather than take the trouble to book regular weekly orders, have informed would-be purchasers that THE AEROPLANE has discontinued publication. The proprietors will be particularly obliged to anyone sending information concerning the circulation of this falsehood. As a matter of fact, THE AEROPLANE has never been in such a strong position as it is to-day. ¶ Those who still find difficulty in obtaining THE AEROPLANE, in spite of ordering it definitely for weekly delivery, may assure its arrival by becoming subscribers. They should then receive it by the first post every Thursday morning.

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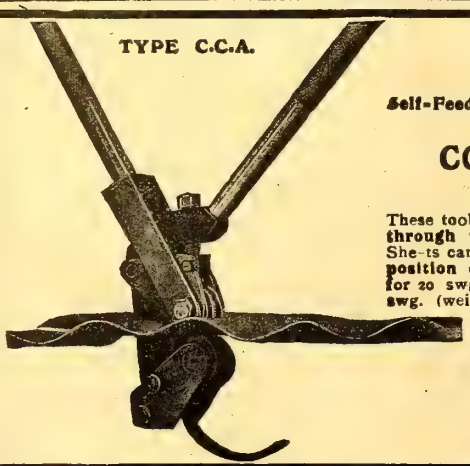
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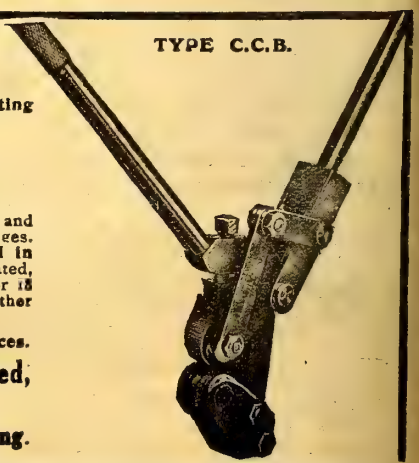
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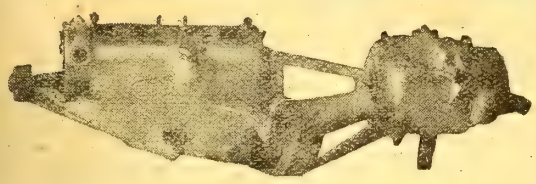
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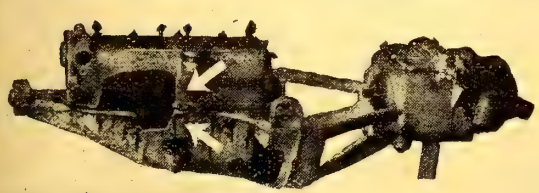
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sheds which are not being used for the purpose of cotton manufacture, for the production of aeroplane parts. It was pointed out that factories which were at present closed down owing to the shortage of cotton could be effectively adapted for the manufacture of aeroplanes, and would give employment to large numbers of operatives.

Mr. Roberts said the matter was receiving careful consideration, and would be submitted to the War Cabinet.

Several members of the deputation expressed the opinion to a Press representative that the proposal to convert the factories would be adopted.

AN ADDRESS TO NOTE.

It should be noted that the Aircraft Manufacturing Co., Ltd., and its allied concerns have now moved into new London offices, the address of which is :—

27, Buckingham Gate, S.W.1.

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The Gallay Radiator Co., Ltd., gave a very enjoyable dinner and smoking concert on Saturday, Nov. 24th, at the Horseshoe Hotel, Tottenham Court Road, to which they invited the heads of departments, including their very popular managing director, Mr. Delaney, who occupied the chair. The idea of having this social evening emanated from the men themselves, and the arrangements reflected great credit on all concerned.

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The musical programme which followed the dinner was entirely composed of items rendered by the Gallay employees, no outside talent being introduced, the final item being the "Gallay Chorus," about which it was remarked that once heard it could never be forgotten.

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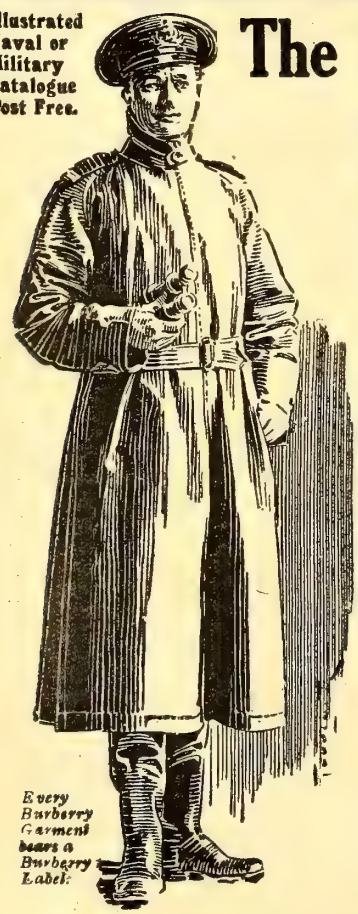
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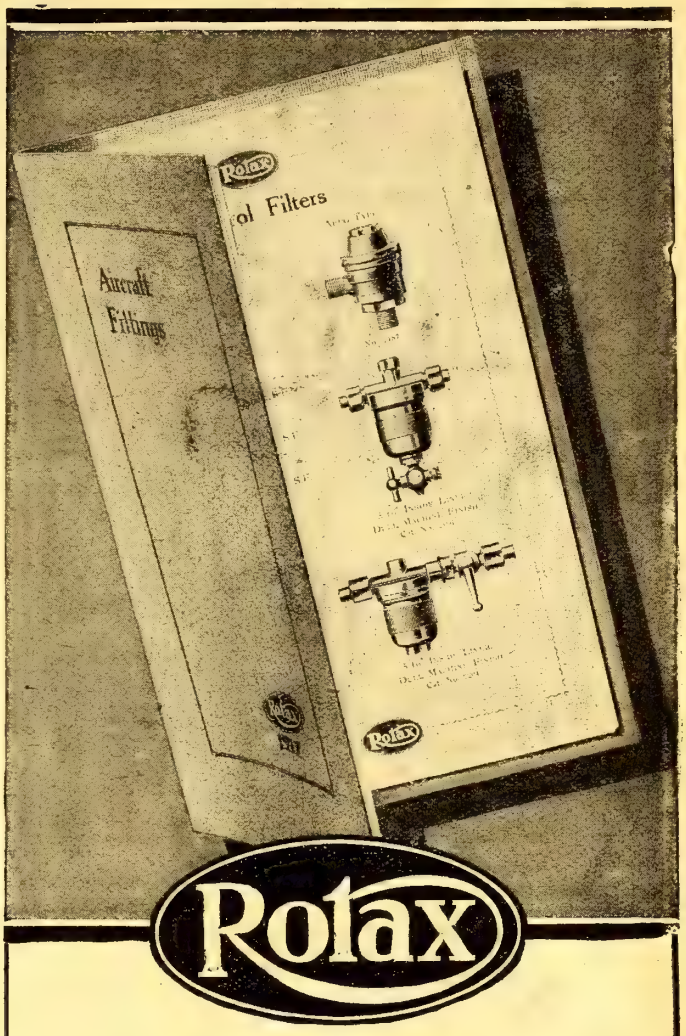
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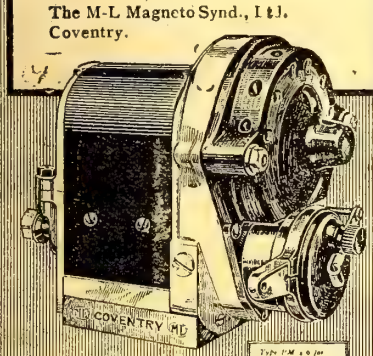
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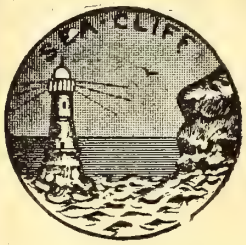
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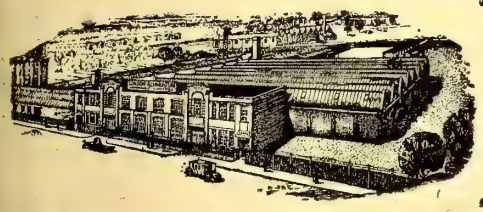
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	5 59 SA				
	8 29 SA	1201 SA			5½
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	8 29 M				
1360	1 29 M	5 02 M			9½
	5 59 TU				
	8 29 TU				
	1 29 TU	5 01 TU			9½
32 Hrs	5 59 W				
	8 29 W				
	1 29 W	3 00 W	32 hrs	7½	
	3 00 W				
1510	6 00 TH	5 01 W		2	9½
	8 30 TH				
11½ Hrs	1 29 TH	5 00 TH	11½	9½	9½
K.31.	6 00 F	7 00 F		1	
E.53	7 00 F				
	8 29 F	10 00 F		2½	
	10 00 F				
1820	1 30 F	4 00 F		5	
1469	4 00 F	5 00 F		1	9½
TOTAL FOR WEEK					53

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Edited by C. Gordon

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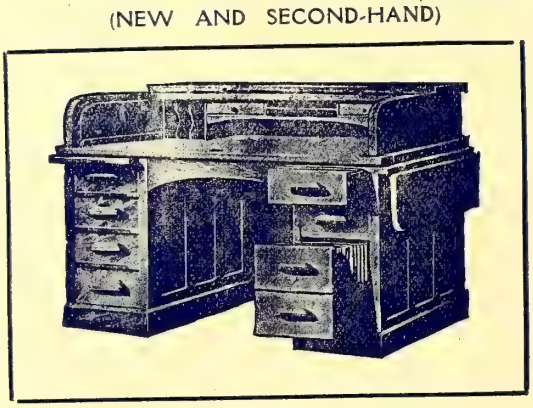
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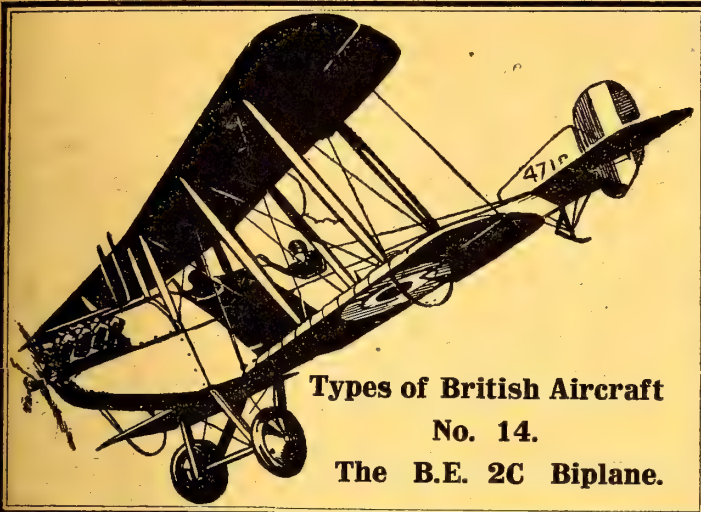
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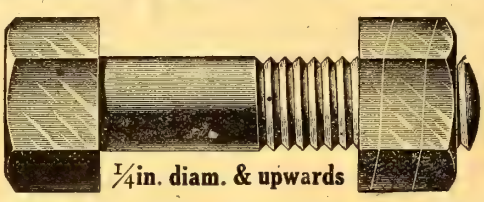
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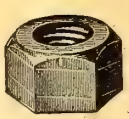
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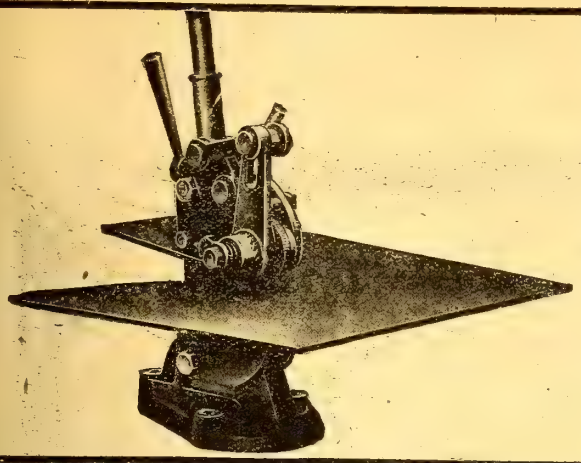
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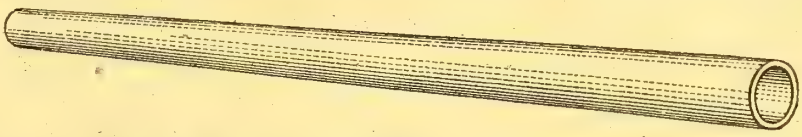
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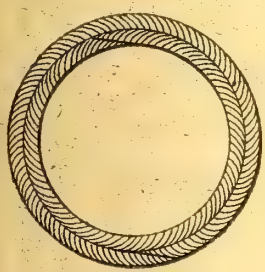
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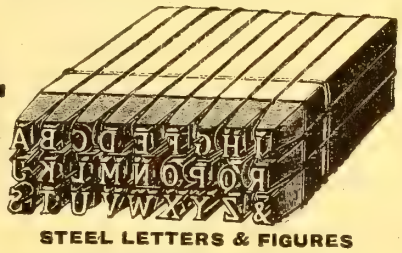
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ON TESTING AND INSPECTING AEROPLANES.

If there is any one operation in producing aeroplanes for the Flying Services which is more important than the careful and skilful inspection of parts under construction it is the testing of Service aeroplanes before delivery. At any rate one is safe to say that the testing of the complete machine is at least as important as the inspection of the parts.

Now, it is fairly obvious to the ordinary intelligence that such testing and inspection should not only be done thoroughly but economically, for quantity of aeroplanes is as essential to the success of the Flying Services as is quality. If insufficient attention is paid to economy the result must be that although quality may be maintained quantity must be decreased, both through waste of good material and through the employment of vast numbers of people unnecessarily on inspection and testing when they might be better employed in producing.

At the present moment, thanks to Coventry and similar places, and because of the terrific efforts the Germans are making to build a fleet with which they hope to push our people out of the air in the Spring and to lay London flat, production is of prime importance, and therefore economy of labour and material is only one degree less important than quality of work.

On various occasions in this paper attention has been drawn to the waste of labour and material by the Aeronautical Inspection Department through too close adherence to the letter of the law and neglect to interpret the spirit with sufficient intelligence. The technical people of the past were also greatly to blame because of their insistence on absurd limits of sizes, and on absurd specifications as to material. Even to-day under a more enlightened, intelligent, and experienced régime much might be done by relaxing specifications and limits to economise material and labour.

Substitution.

For example, there is no reason why the interior finish, or even the material, of a school aeroplane should be as good as that of a war machine. There is no reason why unlimited sand-papering and scraping and general spit-and-polish should be wasted on school machines, or even on war machines. Why should the spars and ribs of any wing be sand-papered to the smoothness of a billiard-ball before being varnished? The Germans do not waste labour on such unnecessary finish, so why should we? It seems almost as unprofitable as fitting solid brass standard Navy padlocks to the doors of aeroplane sheds and putting on an able-bodied man to polish them all day, as appears to be the custom at some R.N.A.S. aerodromes.

As another example, why, when we want all the high-grade silver spruce we can get for war machines, should the A.I.D. and the technical timber people insist on using it everywhere and all over school machines? There are many reasonably good substitutes, and even if they are not quite so strong as the finest spruce, each member of the machine can be made up to strength by making it a trifle heavier. The extra weight cannot matter in a school machine which has no armament to carry and has only to lift petrol for an hour or so. The Germans use main spars in the Gothas made of common deal, with all the saw and tool marks on it, yet they do their job. Not only so, but the economy of labour must be sufficient to supply at least another spar for every one made, which means precisely double the output from a given number of hands.

The Blessed Word "Ersatz."

Again, why use square miles of the finest Irish linen for school machines when the Germans get along perfectly well with coarse cotton or half-cotton fabric for their war machines? And in any case, even if pure linen is esteemed necessary for the wings of school machines, why use it for fuselage covering and tail-planes and so forth, where there is less strain than on the wings? Linen may be necessary on war machines because it is stronger and less inflammable than cotton, but cotton can be made as strong by using coarser thread and a more open weave—as the Germans have shown us—and inflammability does not enter into the question where school machines are concerned. If the petrol catches fire anything will burn, and linen is only really useful in this respect because it will not catch fire from bursting shells, or tracer bullets, or minor incendiary causes.

Literally miles of spruce and acres of linen are to-day being put into training machines of obsolete or obsolescent types which will probably only be burnt when finished, whereas by using a little plain common sense no spruce and no linen need be used in the most up-to-date school machines, not even in those which put up such extraordinary performances under our new and excellent system of training.

If one had time or space in which to go into details one could point out dozens of ways in which material and labour could be economised and put to better uses. It would be worth while, for example, to find out how many places there are, in various designs of aeroplanes, in which brass screws are used where tin-tacks would do just as well and would only take a fraction of the time to put in place.

Most remarkable progress has undoubtedly been made during the last few months in saving labour and material, and the greatest credit is due to those who are responsible for this economy, but there is still room for further improvement along such lines as I have ventured to indicate, more especially in the intelligent relaxation of limits and in the admission of inferior finish without decreasing strength and efficiency, and the substitution of more easily obtainable material.

Let us learn a lesson from Germany, where the word "ersatz," properly meaning "replacement" or "substitute," is being as badly overworked as is the word "camouflage" in this country. They start off with "ersatz butter," "ersatz wool," and work all up the list to "ersatz rubber" and "ersatz copper," till I should not be surprised to find them finishing the war with an "ersatz Kaiser" and an "ersatz Hindenburg."

Test Flying.

The testing of completed aeroplanes, as already stated, is closely analogous in some ways to the inspection of aeroplane parts. Here again, or, perhaps one should say, here especially, there seems to be much room for economy and improvement.

Testing is actually divided into two distinct kinds—firstly, the testing of experimental machines, and, secondly, the testing of standard machines in what are commonly called "acceptance tests."

Experimental tests with new types of machines can naturally only be carried out by highly skilled and experienced pilots, men, moreover, possessing besides skill and experience a peculiar type of mind combining the critical faculty with the mental application of the student, plus considerable mechanical knowledge. Naturally such men are not easily found, and when found are well worth keeping even at considerable expense.

The Pilot Specialist.

They are, in fact, in the position of Harley Street specialists in relation to panel doctors, when compared with ordinary sound and safe pilots who would be good enough for putting machines through their acceptance tests.

Like all specialists, they are highly paid, and they earn their money, for it is to them that the Flying Services owe the extraordinarily fine machines which they possess to-day. The aeroplane designer is never—with, I think, one exception—a skilled pilot, and he is hardly ever even a regular passenger with his own experimental pilots. Such aeroplane constructors as were once pilots have practically all given up flying. Consequently the designer and the constructor both have to rely in almost all cases on their test pilots for accurate knowledge of what their machines do in the air.

The test pilot finds out what is the matter and suggests improvements. If visibility is bad he explains where and why. If a machine handles badly in certain positions he tells the designer all about it. If a certain part vibrates or seems to give unduly while in the air he alone can find it out. And so on through all the peculiarities of the machine and its engine. Thus it may be seen that the Services depend entirely on these test specialists for their successful machines.

A Risky Trade.

Moreover, testing new types is at best a risky business. Less so, of course, than it was some years ago, for knowledge has increased considerably, and designers are less liable to make fatal errors in calculating strengths of material or in placing surfaces than they were in the past. None the less the terrific speeds and climbs and loads of the newer machines, and the astonishing manœuvres which they have to execute, produce new strains in unexpected places which our still very imperfect knowledge of aerodynamics makes it impossible to calculate accurately. So the experimental tester takes initial risks, which, if he survives, are really an insurance for active-service pilots.

Frequently his skill and experience enables him to land safely on a machine which has broken in the air, or to regain control of a machine which in less capable hands would have become uncontrollable and would have ended in an unexplained fatal accident. In this way he saves not only his own life but those of the pilots who have to use machines of similar type, altered and made safe as the result of his escape.

A Right to Gratitude.

Thus one cannot possibly grudge the experimental specialist the high pay that he earns, especially when one remembers that no man can go on flying in this way for ever, and that he must be allowed to pile up in a few years enough money to keep him out of the workhouse after his flying days are done. Taking it all round, the young gentlemen who are doing such gallant work on active service have every reason to be grateful to the experimental pilots, for it is thanks to their bravery, skill, and brains that the average active-service pilot is now able to perform in perfect safety, and as a matter of everyday flying, acrobatic feats which would not merely have seemed, but would have been, impossible to the very finest fliers on the very finest machines of a year or two ago.

One hears occasionally of active-service pilots grumbling about the injustice of civilian testers making their thousands a year in safety and luxury at home, while the pilots at the front risk their lives constantly for a matter of a pound a day (plus field allowances, don't forget). Personally, I have never heard such complaints possibly because I have been fortunate in only meeting active-service pilots who possess common sense. To such grumblers one would merely point out that they themselves are equally lucky in only having to risk their lives for three or four hours a day, on three or four days a week, in getting £7 a week for doing it, and in having a comfortable billet and three square meals a day when not so risking their lives, while others at least as good as they are enduring the constant dangers and discomforts of the p.b. infantry at 7s. 6d. a day as officers or 1s. a day as men.

They might also remember that but for the civilian experimenter their risks would be very much greater and that in many instances they would be glad in time of peace to draw as much pay per week at a desk as they receive per day as officers in the King's Service. After all, life is full of such injustices. Why should I who have slaved in the cause of aviation for the last nine years, only make as much per annum as a successful cheese merchant makes in a week? Yet I would rather have my job than his.

Service Experimenters.

On the whole, one can safely say that the experimental pilot earns every penny he makes, and deserves every encouragement to continue his good work. It would not be fair, however, to leave the subject of experimental flying without paying a slight tribute to the officers of the Service experimental stations. It is true that these officers only take over the experimental machines after the civilian testers have proved that they are practically unbreakable in the air and that they handle well, but both the R.N.A.S. and R.F.C. experimental stations are constantly trying experiments of their own which involve new risks, and those risks are taken cheerfully on ordinary Service pay. Their position in relation to the civilian experimental pilot is perhaps rather that of the Government doctor who investigates plague and other strange diseases in the country's service, as compared with the Harley Street specialist before mentioned.

Both being intelligent men, keen on their work, they are not jealous of one another. And the Government servant, having all the scientific resources of the Government at his disposal, is in a position to acquire special knowledge which is not available to the private

practitioner confined within his own circle. Consequently, when the Government servant chooses to retire he is in a position to set up as a specialist himself, on lines somewhat different from those of his competitors.

The Scientist at War.

Incidentally, there is a story of a certain Service test pilot which deserves recording, albeit it has at present to be told guardedly. The said pilot was up doing a test flight with full war load, guns, ammunition, and so forth, as well as all the special instruments and paraphernalia of the serious scientific tester, when he ran into a bunch of Hun raiders. He proceeded calmly to climb to their height, where he sat, just out of range behind the tail of one of the enemy, and wrote down all the information he could gather, not only about the enemy machine, but about the atmospheric conditions, indicated and corrected heights, air speeds, and so forth—in fact, all the minute particulars which a careful test pilot has to observe to obtain accurate knowledge.

Having done all this with the meticulous care of the trained scientist, he wrote at the bottom of his report "I now propose to engage," put the report, addressed to the O.C. his station, into a bag, dropped it overboard, and proceeded to wade into the battle with the Hun. The further history, as given to me, does not record the results achieved in the scrap, but I gather that good luck delivered his scientific observations to the right place, where they proved of considerable value and interest. The quaint combination of the earnest scientist with the aerial swashbuckler has certainly its humorous side.

If by telling this story I have given undesired publicity to one of those astonishingly modest students who do not seek decorations or honours, I beg that he will accept my apologies. I am entirely ignorant of his name, and only plead that the story is too good to be lost.

Acceptance Tests.

So much, then, for experimental testing. The other kind of testing, as already mentioned, consists in putting machines of standardised types through their acceptance flights for the Services. It is here that possibly labour and material might be saved.

Obviously, to the ordinary mind, it would seem that the cheapest and most effective way of delivering machines to any Service is for the manufacturer to deliver each one as a complete flying unit to the nearest station of that Service. His own test pilot—not necessarily an experimental pilot—would fly the machine after it had been assembled by his own mechanics, and prove to the Service people detailed for acceptance work that the machine was up to the standard performance and fit for service.

This is an ordinary business proposition. If one buys a motor-car one takes it over after the firm's testers have tried it and proved it fit for use. One does not buy a car and then test it at one's own expense and risk. Even American cars are given some sort of road test before being handed over to buyers.

In the case of Service aeroplanes the manufacturer has every incentive to do the job as cheaply as possible. The test pilot is paid by results, and so tries to put as many machines as possible through in the day, regardless of weather. On the other hand, he is not likely to take undue risks, for if he damages machines in landing he has to do all these tests over again for nothing, and if he frequently damages machines through carelessness in getting off the ground he loses his job.

All the risks of breakages are taken by the manufacturer, who is therefore naturally careful about the quality of pilot he employs on acceptance tests. Equally naturally he only employs picked gangs of mechanics on assembling machines for acceptance tests, for he wants the machines assembled properly and quickly. Also, when at any time there is a slackening of deliveries from the works, those men come back to the factory and help to boost up output from the erecting shop.

The whole thing is done on business lines, and though some firms are better than others in getting their machines through their tests, just as some firms have a better output than others with the same number of hands, the fact remains that business is business and payment by results produces the best results.

An Uneconomical Method.

Equally obviously, to the ordinary mind, it would seem that the most expensive and least efficient way of getting machines through quickly for the Services is to establish a number of acceptance stations where machines are delivered by the manufacturers in pieces, to be stuck together by Service mechanics and flown for the first time by Service pilots.

I should be the last to cast aspersions on the energy, loyalty, and devotion of R.N.A.S. or R.F.C. mechanics, but the fact remains that there is a vast difference between doing urgent repairs to machines in aerodromes at the front under the immediate eye of the pilots and observers who want them for use at once, and assembling machines for acceptance tests in an aerodrome at home where they will be flown when the Service test pilot feels inclined, or when he has finished his breakfast, or when the weather improves. The pilot has no particular incentive to hurry himself nor his mechanics. None of them is paid by results.

If the weather changes during lunch there is no reason for the pilot to rush out and put a machine through its tests during a fine interval, so that he can catch a train to another station where another machine is waiting for him. Nor do the men hustle to put the machine together so that it can be tested and let them get back home for the week-end or on to another job which is waiting for them. Nor is there any bonus attached to doing good work quickly.

Dockyard versus Shipyard Again.

It is simply the old, old question of the Government dockyard versus the private shipyard all over again, or the old R.A.F. versus the aeroplane "trade" on the question of output. How on earth, with all these years of experience behind them, any official people can have any doubts as to which is the best and quickest and most economical method of running acceptance tests passes my comprehension.

The only valid reason which I can discover for favouring officially misconducted assembling and testing stations is that somebody must be in charge of the job, and the less efficient the system may be and the more the men who have to be employed to work it, the higher must be the rank of the man in charge. Which is a beautiful system of payment by lack of results which would please the most ardent Trade Unionist of the Coventry school.

A Pure Hypothesis.

Imagine, for example, if the new Air Force adopted the official acceptance station system. The personage in charge would obviously have vast numbers of officers and men under him, and if he only let the thing become so inefficient that he could collect some 12,000 men on the job—instead of about 1,200 with which the "Trade" would do probably the same amount of work—he would have to become a Rear-Wing-Airmiral, or whatever rank might be coined by the Air Council to correspond in the Air Force with a Major-General in

the Army, with pay to match. Which would be very like profiteering in the case of a mere commercial person.

A Simple Proof.

If any official person still has any doubts on the subject it should be quite simple to find out from the "Trade" firms how many machines each firm has put through their tests in the past six months: how many mechanics have been employed in assembling and tuning: how long each machine took between leaving the works and being accepted: how many test pilots were employed: how much was paid in fees to pilots: how much was charged in the firm's books against each machine for "acceptance tests": and how many machines were crashed by the firm's pilots in course of testing. Also how many machines have been put through tests by each civilian test pilot—that is a very important figure, as it affects the question of man-power directly. The figures must, of course, be distinct from all experimental flying, which is another matter altogether.

Against this let the inquiring official person find out how many machines have been put through the various Service acceptance stations during the same period: how many air mechanics and other N.C.O.s and men have been employed there, together with the amount of their pay and the cost of their food and housing: how long each machine actually passed was hanging about between delivery from the factory and passing its tests—excluding those which are still hanging about after weeks of delay: how many Service test pilots have been employed: how many machines each pilot has put through tests in the period: how much the said pilots have drawn in pay and allowances and travelling expenses: how many machines have been crashed by Service pilots in the course of testing.

I think it will be found that the balance is very heavily in favour of civilian testing if the figures are properly compared. For example, if a civilian pilot puts 25 machines through in a week without crashing one, and gets £10 per machine for doing it—or £250 for his week's work—he is a good deal cheaper than five Service pilots who do five machines a week and between them crash three machines. The five Service pilots will draw about £35 in pay perhaps, but they will have done £3,000 worth of damage, besides deleting three machines which the Service required urgently at any price. And the chances are that anyhow the multitude of air mechanics attendant on the job would cost so much more than the dozen or so mechanics required by the "Trade" to erect and true up the same 25 machines that the difference between the £35 and the £250 would be swallowed up without counting smashes.

A False Argument.

I have been told that the chief objection to civilian testing is that it is not fair for civilian testers to be making fortunes while Service pilots only draw Service pay for the dangers of active-service flying. That is quite the most futile argument that ever happened. It is far more unjust that Cuthbert Jones, aged 24, unmarried and Class A 1, draper's assistant at a pound a week until June, 1915, and now a "skilled meachanic" and "indispensable" earning £5 per week making "plum and apple" tins for the Army, should be living in the lap of luxury at home while Henry Smith, aged 41, married, five children, Class B 2, proprietor of a flourishing little business on which he was depending for comfort for himself and his wife in their old age and for the decent education of his children, and now a conscript, should be digging latrines under shell-fire in France at 1s. per day, with the prospects of coming home wrecked in health, a ruined man, to start life anew, if he escapes being killed.

Again I wish to remind these envious young gentlemen (temporary in some cases) that they are all of them better off than the rest of the King's officers, and that many of them are better off than they ever hoped to be in their lives. Also that it is better for them to have the greatest possible number of machines delivered in the shortest possible time, under proper commercial organisation, than it is for a few of them to have cushy jobs at home and get fewer machines at the front.

An Admissible Objection.

A more reasonable objection is that owing to civilian test pilots taking on more work than they can get through during a spell of fine weather machines ready for test are apt to accumulate at aerodromes instead of being handed over to the Service at once.

The argument, though admissible, is not really sound, for I know of cases in which civilian pilots have put a batch of machines through their tests at a Service aerodrome, and have come back after a certain period to put another batch through, only to find some of the first batch still there because the "ferry pilots" of the Service have been too busy to take them all away.

The Real Answer.

The answer to that objection is, very obviously, to encourage commercial testing and so assure a reasonable living wage to a greater number of civilian test pilots. There are plenty of war-worn aviators, unfit for military service, some of them already discharged from the Services, but quite fit for test flying, who could take on such work. These lads have ruined their health in the country's service, they have learned their jobs at the country's expense, and they have a better right to the profits of testing work than those who are still fit and well but a trifle bored with the war.

The number of civilian pilots who have not been in either of the Services is extraordinarily small, and of that small number almost all are either highly skilled experimental specialists who come under the category first discussed, or else they are men who have been turned down by the Flying Services on account of physical defects, though excellent pilots, and so are doing more useful work as civilian testers than they would be doing as Army clerks or barrack-sweepers.

If the system of civilian testing is extended, as it ought to be in the interests of efficiency, economy, and rapid production, the only people who will benefit will be those who most deserve to benefit—namely, discharged flying officers who joined of their own free will early in the war and have been through it in the full sense of the phrase.

Testing, Design, and Supply.

The question of testing new or standard machines is naturally allied to the question of design of new types and alterations in standard types. It is interesting to note that when the Air Ministry comes into being it will be responsible for design, whereas the Ministry of Munitions will deal with all supply and production. This opens up the question as to how technical points arising during the process of production will be handled expeditiously.

Hitherto, as contractors know, the Technical Department of the Air Board has only been able to communicate with them through the Supply Department, which roundabout system naturally causes delay. It is, at any rate, satisfactory to know that design will remain under the Air Ministry, but the whole subject requires further discussion than space permits this week.

C. G. G.

S·C·G·

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TWO ROYAL VISITS.

On Dec. 4th the King and Queen motored to the Hendon district, where they spent some two hours inspecting aircraft works. They visited the works of the Integral Propeller Co. and saw the shaping of the wood, then the clamping together of a large number of thin sections of mahogany or walnut, and then the sections being firmly glued together. The rough resultant was placed on a shaping machine, which has two principal arms; the lower one travels over an exact pattern of the propeller blade, while the upper one shapes out the glued sections to the exact shape and size required. So nice has the balance to be, however, that very delicate manipulation by hand is necessary to supplement the machine shaping. Their Majesties were conducted during this part of their tour by Mr. and Mrs. Howard Latimer-Voight who, in the early days, established the company on modest lines, and have since extended it until it is one of the most important factories of its kind.

In the workshops the heartiest greetings were given to the King and Queen, and in the Y.M.C.A. quarters several hundred of women assistants, most of them voluntary, lined up and sang "God save the King" as their Majesties passed through.

The remainder of the visit was devoted to the various departments of the Grahame-White Co.'s Works, where they were received by Mr. Claude Grahame-White, who presented the heads of the principal departments and then conducted the Royal visitors through the various shops.

The company has a commodious temporary canteen, and is about to replace it by a permanent structure. Mr. Grahame-White requested His Majesty to lay the foundation stone of the new building. This the King did in presence of a large number of officials and a guard of honour of leather-clad flying men. It is designed to accommodate 3,000 people.

The departments of the works inspected included the erecting shops, the machine department, the fitting rooms, the propeller shop, the wing-making department, the wood factory, and the "doping" rooms. Finally the visitors were invited to inspect a completed machine. The King climbed up beside the pilot's seat, and spent some time discussing the equipment and fittings with Mr. Grahame-White.

THE GERMAN WAY.

The leading article on "Testing" was written a week ago. By a curious coincidence the following paragraph arrived, just as this issue was going to press, from a well-informed correspondent in a neutral country:—

> Much of interest can be read between the lines of the advertisements in the German technical press. Thus the large number of "Situations" as test pilots of A, B, C, D, E and G aeroplanes are noteworthy, telling tales of vacancy in the aviators' circles.
>
> The Daimler Motor Co., of Stuttgart, advertise for a clever and reliable test pilot, with knowledge in flying "G" aeroplanes, for their works in Sindelfingen, where they must either manufacture aeroplanes or carry the engine tests out in the air.

The indication is clearly that the Germans use civilian testers, or invalided Service pilots, for their delivery work. Long before the war the German Army encouraged civilian flying while in this country we discouraged officially everything of a trade nature. None will deny the business ability of the Germans, both before and during the war, so their methods of aiding output are well worth considering.

SOUND SENSE.

The following is taken from an article by Mr. Massac Buist in the "Morning Post" of Dec. 8th:—

Lord Rothermere assumes office as chief of our new aerial organisation at a critical time. On the one hand the warning given to Germany as to the scale of American aerial activity at a later date has brought about greatly increased quantities of German machines already and not only that, but a notable improvement in the quality of the machines.

On the other hand, British workers concerned with aircraft equipment in Coventry, kept safe at home by the sacrifices of their fellow-countrymen in the trenches, have been striking on purely technical points. The strike has been nothing less than tragic, particularly as a deal of "sympathetic" striking is still taking place in the aircraft industry in other towns.

The public probably has the impression that the Coventry business settled all would be well. The fact is not so. Labour is looking for trouble, because it has been taught by successive Governments of recent years that it has only to threaten trouble to get anything it pleases.

The trouble is made almost entirely by the younger men who have no families to keep and who, if they were not at present being protected, would be in the trenches.

In France they have none of this sort of nonsense. They proceed on logical lines. At threat of any trouble they say merely: "You do not like the terms of the work you are doing in the factories here. Very well, we do not compel you to continue there, because an alternative job is provided for you in the fighting line. You have merely to indicate which of the two you prefer and we will provide for you." That prevents trouble. There is no question of employing troops to fire on rioters, or nonsense of that sort. Instead, the State sets the would-be striker to meet German competition.

Of course a deal of trouble is due to the ridiculous tales that have been put abroad touching alleged profiteering. That has occurred in certain industries. Certainly it is not occurring in connection with manufacturing forms of enterprise in this country that are supplying the requisites for waging the war. The reason is obvious. Government accountants have in every case tested and taken record of actual costs of production. A fixed ratio of profit is allowed on those proved costs. Further, there comes automatically into play the Excess Profits Duty.

The net result is that a pound of capital employed in manufacturing to-day earns less money by far than in peace time. It is time the Government intimated the fact for the benefit of all sections of the community. To put it the other way round, to earn a sovereign of profit to-day from manufacturing enterprise requires the employment not only of more capital, it besides involves a vastly greater risk on the part of the capitalist and employer than in peace time.

If a few of these facts were brought out, and if individual examples were cited—the Government could get them from any quarter it chose at random—labour might realise that further agitation on its part is in the nature of deliberate profiteering and tyranny, apart altogether from its effect in causing unnecessary loss of life at the front.

COMRADES OF THE GREAT WAR.

The first club founded by the Comrades of the Great War was opened on Dec. 8th at Addlestone, near Weybridge. A large residence has been acquired and furnished by Major Gordon Watney (who also presented £5,000 to the headquarters fund) for the purposes of the Weybridge branch.

The opening ceremony was performed by Lady Norton Griffiths, and the company included Gen. Sir Edward Hutton and Col. Young.

Sir John Norton Griffiths said the movement was due to an incident near Ypres in April, 1915, when on a dirty night officers and men were digging out 22 men who had been buried by a German shell. The spirit of comradeship there displayed led an officer and serjeant to declare their intention of founding an organisation to perpetuate such a spirit of comradeship. The Comrades movement was non-political and non-sectarian.

Capt. Towse, V.C., said there was no need to point out the meaning of comradeship to men who had faced death together in the trenches. If all those who had been "over the top" together would cling together it would make for the good of the country.

AERIAL ADVERTISING.

On Dec. 8th, at the close of the London War Savings Campaign a "Blimp" and two flights of aeroplanes flew over Trafalgar Square, dropping discs of cardboard, bearing the following appeal:—

"From the British aeroplanes to the citizens of London:—Help us to defend London and attack the Huns by providing us with more aeroplanes. You can do this to-day by buying National War Bonds at the tank in Trafalgar Square. The more you buy the better chance you give those who are fighting for you."

The crowd was greatly interested in the engine from one of the Gotha biplanes captured in the air raid on Dec. 6th, which figured among the various exhibits in the Square.

AN AIRSHIP RAID.

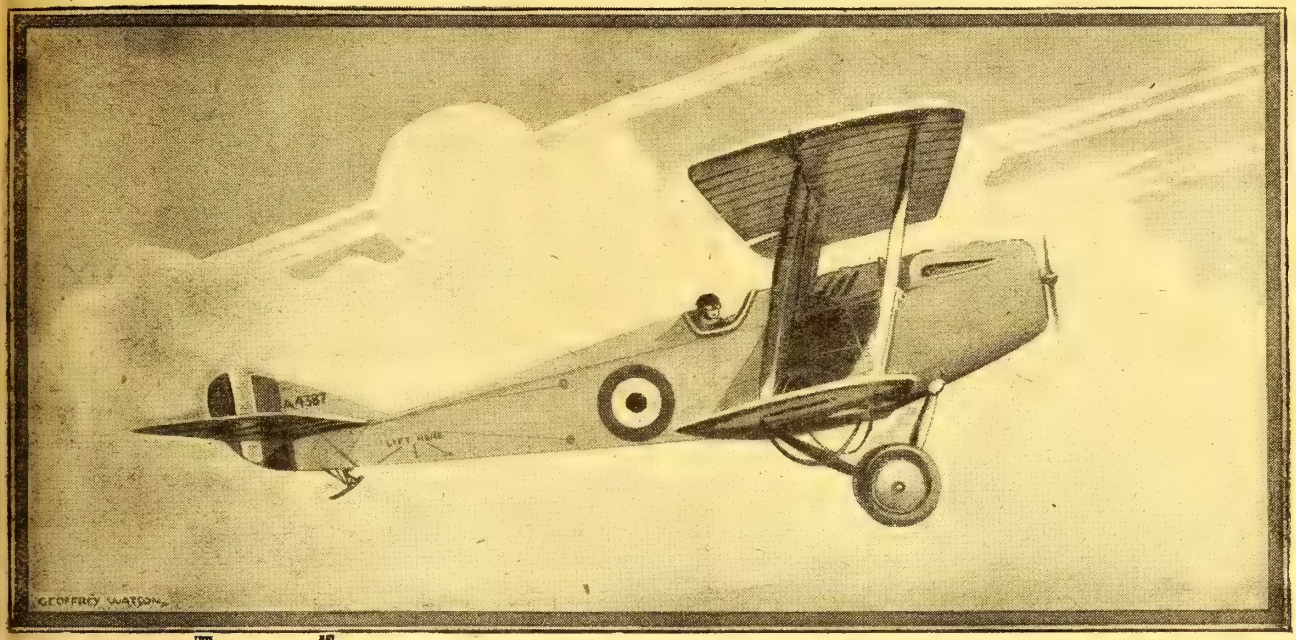
On Friday, Dec. 7th, a British imitation Zeppelin publicly displayed itself over London at a low altitude during the lunch hour.

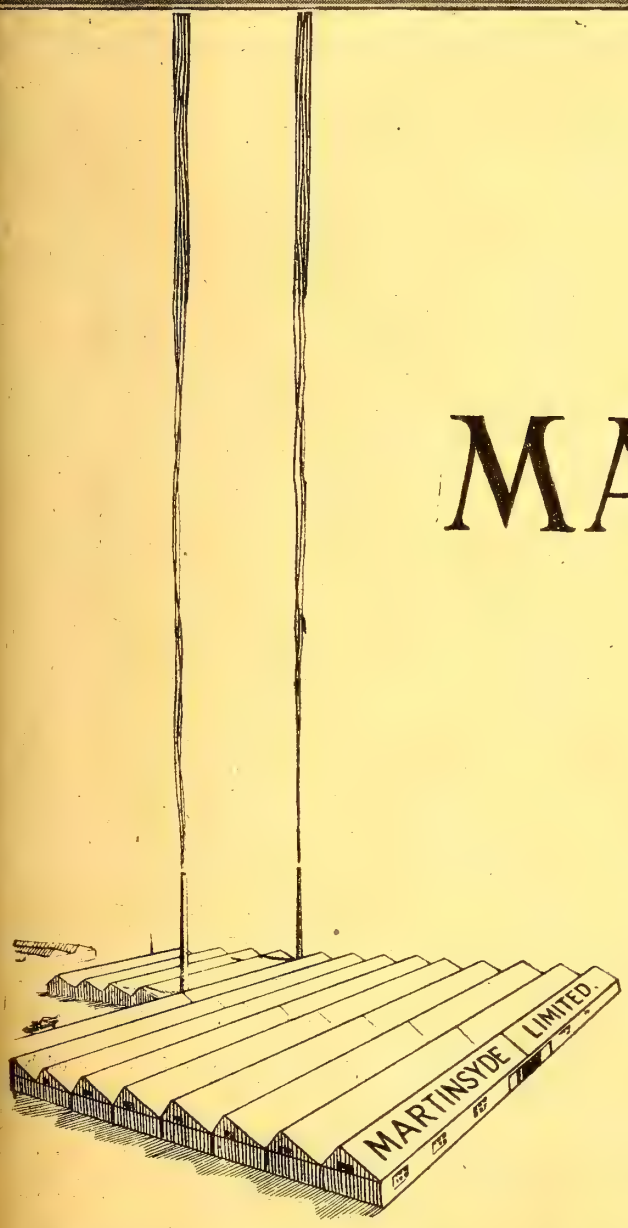
AIRCRAFT IN THE HOUSE.

On Dec. 6th **Colonel F. Hall** (U., Dulwich) asked the First Lord of the Admiralty whether under the Air Forces Bill the time previously served in the Army or Navy by officers or men transferred to the Air Force was to be added to the time served in the latter service for the purpose of calculating pension provision.

Dr. Macnamara, who replied, said the position of officers in this matter was now under consideration between the Admiralty and the Air Board. The maximum time allowed to count for pension purposes when ex-Army men joined the Navy, or vice versa, in circumstances other than those of invaliding from their earlier Service, was four years, and this was subject to the conditions that no time was allowed for which the man received an assessment of character inferior to "Fair"; that a break of five years did not elapse between the two Services; and that the former Service was acknowledged on entering the sister Service.

Sir A. Mond, in reply to **Mr. W. Thorne** (Lab., West Ham), said that the Air Minister was taking over the Metropolitan Water Board offices at the Savoy Hotel, and that he was aware that one part of the hotel was not occupied by the Metropolitan Water Board. As it was absolutely essential that the branch of the Air Board for which this accommodation was required should be in close proximity to the headquarters of the Board, he could see no useful purpose in considering the commandeering of the Ritz Hotel.





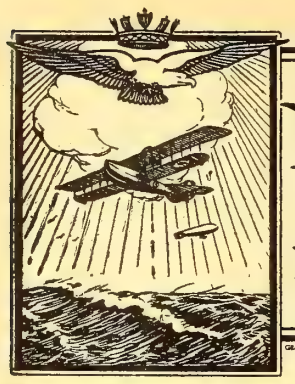


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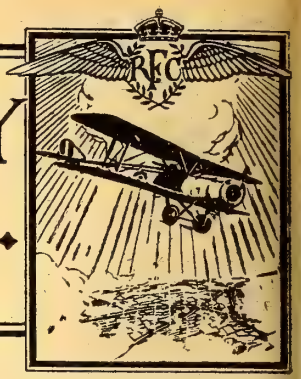
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NAVAL and MILITARY AERONAUTICS



FROM THE "LONDON GAZETTE."

War Office, Dec. 4th.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing.—Sqdn. Comdr.—Temp. Capt. R. E. Saul, Gen. List, from a Flt. Comdr., and to be temp. Maj. whilst so empld., Nov. 21st.

Flt. Comdrs.—From Flying Officers, and to be temp. Capts. whilst so empld. :—Sec. Lt. (temp. Lt.) B. B. Toms, R. War. R., Spec. Res., Nov. 1st. Lt. R. E. Angus, Yeo., T.F., Nov. 18th. Temp. Lt. W. R. G. Pearson, Gen. List, Nov. 19th.

Depot Comdr.—Temp. Maj. W. H. Lang, Gen. List, from a Park Comdr., and to be temp. Lt.-Col. whilst so empld., Aug. 31st.

Gen. List.—Cdt. (Flt. Serjt.) E. P. Critchley, from R.F.C., Nov. 24th.

TERRITORIAL FORCE.—R.F.C.—To be temp. Capts. :—Lt. J. S. Irving, Sec. Lt. (temp. Lt.) H. Medcalf, Sec. Lt. (temp. Lt.) G. S. Wilkinson, Sec. Lt. (temp. Lt.) J. H. Glover, Nov. 15th.

War Office, Dec. 5th.

REGULAR FORCES.—Staff.—Attached to Headquarter Units.—Staff Capt.—Temp. Maj. the Rt. Hon. Sir J. A. Simon, K.C.V.O., Gen. List, Oct. 25th, 1917.

Establishments.—R.F.C.—Mil. Wing.—Flt. Comdrs.—From Flying Officers, and to be temp. Capts. whilst so empld. :—Sec. Lt. W. W. Rogers, Spec. Res., Nov. 18th. Temp. Sec. Lt. A. H. C. A. Rawson, R. War. R., Nov. 21st.

Memorandum.—Lt. (temp. Capt.) G. de L. Wooldridge, R.F.C., Spec. Res., to be temp. Maj. while specially empld., Dec. 6th.

War Office, Dec. 6th.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing.—Flt. Comdrs.—From Flying Officers :—Lt. (temp. Capt.) R. E. A. Dash, E. Surr. R., T.F., and to retain his temp. rank whilst so empld. ; and to be temp. Capts. whilst so empld :—Temp. Sec. Lt. O. E. J. McOustra, Gen. List, Nov. 20th. Lt. F. R. R. Woodward, Lan. Fus., Spec. Res., Nov. 23rd.

War Office, Dec. 7th.

REGULAR FORCES.—Staff.—His Majesty the King has been pleased to approve of the promotion to Brevet Col. of Major and Brevet Lt.-Col. (temporary Major-General) John Maitland Salmond, C.M.G., D.S.O., Royal Lancaster Regiment, Director-General of Military Aeronautics. in recognition of his distinguished services.

Establishments.—R.F.C.—Mil. Wing.—Adjt.—Temp. Sec. Lt. (temp. Lt.) R. A. Perpoint, Gen. List, from a Flying Officer, and to be temp. Capt. (with pay and allowances as Lt.) whilst so empld., Nov. 23rd.

Equipment Officers, 1st Cl.—From the 2nd Cl.—Lt. C. G. Hetherington, Spec. Res., and to be temp. Capt. while so empld. ; temp. Capt. H. L. Crichton, Gen. List, Nov. 16th ; Sec. Lt. (temp. Lt.) J. Rylands and to be temp. Capt. whilst so empld., Nov. 21st.

Gen. List.—Capt. (temp. Lt.-Col.) G. B. Hynes, D.S.O., R.A., a Depot Comdr., to be temp. Col. whilst specially empld., Dec. 1st. The following from R.F.C., to be temp. Sec. Lts. :—Serjt. F. S. Ganter, Nov. 9th. Serjt.-Maj. E. Lewis, Serjt.-Maj. E. M. Ling, Flt. Serjt. G. J. H. Stein, Nov. 26th.

Special Reserve of Officers.—Supplementary to Regular Corps.—R.F.C.—Mil. Wing.—Lt. (temp. Capt.) N. H. Read relinquishes his commn. and is granted hon. rank of Lt., Sept. 15th.

TERRITORIAL FORCE.—R.F.C.—To be Sec. Lts. :—Serjt.-Maj. G. A. Campbell, 2nd Cl. Air Mech. R. McKinnon Wood, Dec. 8th. Lt. W. S. Senior to be Adjt., vice Capt. H. P. Crosland, and is granted actg. rank of Capt., with the pay and allowances of a Lt., Oct. 9th. Capt. P. P. Miers is secd., Nov. 24th. Capt. A. R. Wood is secd. for duty and is graded for purposes of pay as Staff Lt., 2nd Cl., whilst so empld., Oct. 2nd. Capt. A. H. Bowhill to be Adjt., vice Capt. H. A. Campbell (Arg. and Suthd. Highrs.), Oct. 19th. Serjt. S. M. Ogden to be Sec. Lt., Oct. 14th. C.S.M. W. H. Belton to be Sec. Lt., Oct. 14th. Lt. H. R. Ward (Hon. Capt. in Army) is secd., Nov. 10th. Lt. L. C. Vernon to be actg. Capt. whilst commanding a Co. from Aug. 16th to Nov. 24th.

War Office, Dec. 8th.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing.—Flt. Comdrs.—From Flying Officers, and to be temp. Capts. whilst so empld. :—Temp. Sec. Lt. (temp. Lt.) A. S. Lee, attd. Notts and Derby R., Nov. 20th. Temp. Sec. Lt. H. H. Maddocks, Gen. List, Nov. 24th.

Asst. Instr. in Gunnery.—(Graded as an Equipt. Officer, 3rd Cl.).—Sec. Lt. S. M. Campbell, Sco. Rif.,, T.F., and to be secd., Sept. 1st.

Memorandum.—Serjt. S. J. Clinch, from R.F.C., to be Sec. Lt. whilst serving with R.F.C., Nov. 18th.

War Office, Dec. 10th.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing.—Flt. Comdrs.—From Flying Officers, and to be temp. Capts. while so empld. :—Sec. Lt. H. J. Hamilton, D. of Corn. L.I., Nov. 23rd. Temp. Sec. Lt. B. J. Silly, Gen. List, Nov. 29th.

Gen. List.—To be temp. Lt. :—H. Verdon Roe, late Lt., Manch. R., Dec. 8th.

Memorandum.—To be temp. Lt.-Col. :—Bt. Lt.-Col. W. D. Ingle, Midd'x R., whilst comdg. a R.F.C. Cadet Wing, Sept 19th.

SPECIAL RESERVE OF OFFICERS.—Supplementary to Regular Corps.—R.F.C.—Mil. Wing.—Capt. E. S. Skipper is placed on the ret. list on account of ill-health, Dec. 11th.

FROM THE COURT CIRCULAR.

Buckingham Palace, Dec. 4th.

Their Majesties, attended by the Countess Fortescue, Major Reginald Seymour and the Earl of Cromer, visited the Integral Propeller Co. at Hendon, and were received by Mr. Howard Voight, managing director.

The King and Queen afterwards proceeded to the Grahame-White Aviation Co., where they were received by Mr. Claude Grahame-White, chairman and managing director.

Major C. S. Paulet, representing the Ministry of Munitions, was also in attendance.

Buckingham Palace, Dec. 5th.

The following Officers had the honour of being received by the King this morning, when His Majesty conferred Decorations as follows :—

The Distinguished Service Cross.

Flt. Comdr. Reginald Leslie, R.N.A.S.

The Military Cross.

Maj. Allen Morton, R.F.C.
Capt. Montague Stuart-Menteith, Lincolnshire R., attd. R.F.C.
Capt. Murray Pickthorn, A.S.C., attd. R.F.C.
Lt. Talbot Lehmann, Essex Regt. and R.F.C.

Buckingham Palace, Dec. 7th.

Sec. Lt. P. A. O'Brien, R.F.C., had the honour of being received by the King to-day.

NAVAL.

The following appointments have been made in the Royal Naval Air Service :—

Dec. 4th.—Warrt. Officer II (temp.).—T. H. Sims, promoted to Lt. (R.N.V.R., temp.), seny. Oct. 9th.

Dec. 5th.—Flt. Sub-Lt. (Temp.).—K. Ogden, promoted to Flt. Lt. (temp.), seny. Nov. 17th.

Sub. Lt., R.N.V.R. (Temp.).—W. A. Ross, promoted to Lt. (temp.), seny. Nov. 12th.

Dec. 8th.—A temp. commn. as Lt., R.N.V.R., has been granted to A. J. Woodhouse, seny. Dec. 10th.

Dec. 10th.—Mr. C. E. Fox granted temp. commission as Lt. (R.N.V.R.), seny. Nov. 28th.

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Admiralty Communiqués.

Dec. 6th.—On Dec. 5th naval aircraft carried out a bombing raid on Sparappelhoek aerodrome. Many bombs were dropped on objective and also on a train leaving Engel dump.

Numerous engagements with enemy aircraft have taken place during patrols, with the result that three hostile machines have been destroyed and one driven down out of control.

During Dec. 4th also, in the course of our patrols, three enemy aircraft were shot down out of control.

All our machines have returned safely.

Dec. 7th.—During December 5th and 6th bombing raids were carried out by naval aircraft on the following objectives:—Uytkerke aerodrome, St. Denis Westrem aerodrome, Engel aerodrome, Bruges dock, and various railway traffic.

Bombs were observed to explode, and fire was caused amongst huts and sheds.

All machines returned safely.

In the course of the usual fighting patrols two enemy aircraft were destroyed; four more were shot down completely out of control, three of which were probably destroyed.

Dec. 9th.—During the forenoon of Dec. 8th naval aircraft carried out a bombing raid on Aertrycke aerodrome (north of Thourout). The weather conditions were cloudy, but many bombs were dropped on objective. The bombers were attacked by enemy aircraft scouts, two of which were driven down completely out of control and appeared to be damaged.

Many fighter patrols have been carried out, during the course of which two hostile machines were destroyed and one shot down completely out of control.

All our machines have returned safely.

The Casualty List.

Reported Dec. 5th.

Accidentally Injured.—Hall, Prob. Flt. Officer K. W. J., R.N.

Previously reported Missing, now reported Prisoner.—Clemson, Flt. Comdr. A. W., D.S.C., R.N.

Reported Dec. 6th.

Accidentally Killed.—Scott, A. E., Air Mech., 1st G., F5276; Wilson, E. J., Ldg. Mech., F4131.

Drowned.—Allen, E., Actg. Air Mech., 1st Gr., F11827.

Reported, Dec. 7th.

Accidentally Killed.—Dyson, Prob. Flt. Officer E. H., R.N.

Previously reported Missing, now reported Prisoners.—Linnell, Flt. Sub-Lt. H. G. B., R.N.
Macdonald, Flt. Sub-Lt. A., R.N.
Smith, Flt. Sub-Lt. J. S., R.N.

Wounded.—St. Clair-Morford, Capt. A. C., M.C., R.M., attd. R.F.C.

Reported Dec. 10th.

Previously reported Died of Wounds, now reported Accidentally Killed.—Beattie, Flt. Sub-Lt. W. J., R.N.

Missing, believed Drowned.—Gillespie, Flt. Sub-Lt. L. G. H., R.N.
Odle, Obsr. Sub-Lt. H., R.N.

Previously reported Missing, now reported Not Missing.—Stallard, Flt. Sub-Lt. R. J., R.N.
Rogers, Obsr. Sub-Lt. A. D., R.N.

Accidentally Injured.—Adam, Flt. Sub-Lt. O. P., R.N.
Dixon, Flt. Sub-Lt. F. E., R.N.

Previously reported Missing, now reported Prisoner.—Sieveking, Flt. Lt. L. G., D.S.C., R.N.

ROYAL NAVAL DIVISION.—Killed.—Johnstone, Sub-Lt. H. K., R.N.V.R., attd. R.F.C.

PERSONAL NOTICES.

Engagements.

LYNE—BOND.—A marriage has been arranged between C.P.O. Edgar Lyne, R.N.A.S., eldest son of Mr. Edgar Lyne, of Streatham, and Gladys Mary Muir, eldest daughter of Mr. and Mrs. H. T. Bond, of Bedford Park, Chiswick, and will take place at St. Michael and All Angels', Bedford Park, Chiswick, at ten o'clock, Dec. 15th.

MOORE—BECKER.—A marriage has been arranged between Flt.-Comdr. W. G. Moore, D.S.C., R.N., second son of the late W. H. Moore and of Mrs. Moore, of Woodfield, Malvern Wells, and Haydee, daughter of Mr. and Mrs. Fred Becker, of Sutton Hall, Heston, Hounslow, and Don Cottage, Aberdeen.

Birth.

OLIVER.—On Dec. 4th, at 102, Eaton Place, the wife of Wing Comdr. Douglas Oliver, D.S.O., R.N., of a son.

The following has been communicated to the Press for publication:—

Particulars are available of the work done by naval aircraft during September. The total distance covered by the patrols was more than 170,000 miles, of which 90,000 miles was covered by seaplanes and 80,000 miles by airships.

On seven occasions ships which were being attacked by submarines sent S.O.S. signals, which brought seaplanes to their assistance in time to save them by compelling the submarines to dive. Several hundred ships were convoyed during the month by aircraft, and in no instance has a submarine attacked a ship while under aircraft escort.

When a destroyer sights a submarine some five or six miles away, it goes to the attack at about 30 miles an hour, so that the submarine has 10 minutes or so in which to dive beyond the reach of the destroyer's depth charges. But when a seaplane sights a submarine at the same distance, it flies to the attack at anything from 80 to 100 miles an hour, so that the submarine has only three or four minutes before bombs begin to fall round her.

A seaplane recently sighted a German submarine on the surface, flew directly over her before she had a chance to dive, and dropped on her a bomb, which was seen to make a large hole in the deck. Immediately afterwards the seaplane pilot saw through the mist three more German submarines, in line abreast, followed by three German destroyers, and escorted by two German seaplanes.

All six vessels fired their anti-aircraft guns at our seaplane, but the German seaplanes did not attack, because they could not get through the barrage put up by the fire of their own destroyers and submarines. Our seaplane turned, dropped another bomb on the wounded submarine, saw her sink amid a pool of oil, in which fragments of her floated, and then retired from an unequal contest, at the same time sending a wireless message as to where three of the enemy's destroyers were to be found.

MILITARY.

G.H.Q. Communiqués.

Dec. 4th, 9.40 p.m.—On the 3rd instant, a great deal of reconnaissance, artillery, and photographic work was carried out by our aeroplanes.

Villages in the occupation of the enemy on the Cambria battle front were attacked with bombs and machine-gun fire from the air, and our aeroplanes also co-operated with our infantry in the local fighting east of Ypres.

During the night 291 bombs were dropped by us on villages west of Cambrai, some of the pilots engaged on this work making as many as three consecutive trips.

In air fighting two hostile machines were driven down out of control.

Two of our aeroplanes are missing.

Dec. 5th, 10.15 p.m.—On the 4th instant, although the weather was fine, a dense haze over the line greatly interfered with work in the air.

Reconnaissance work was carried out by our aeroplanes throughout the day, and 118 bombs were dropped on an enemy aerodrome north of Douai and on villages and German machine-gun emplacements in the battle area. Several thousand rounds were fired at the enemy's troops in their trenches and in the open.

Only one or two fights took place in the air, and no decisive results were obtained.

None of our machines are missing.

On the afternoon of the 5th instant two raids were carried out by our aeroplanes into Germany. These are the first that have been possible for over a month owing to incessant bad weather.

One raid was carried out on the large railway junction and sidings at Zweibrücken (17 miles east of Saarbrücken) and the other on the works at Saarbrücken. Many direct hits were observed in both cases, and two large fires were started.

Hostile anti-aircraft gunfire was heavy and accurate, but all our machines returned safely.

Dec. 6th, 9.33 p.m.—On the 5th inst. there was great activity in the air on both sides.

Our aeroplanes carried out a great deal of work by our artillery, as well as several long-distance reconnaissances, and took many photographs of the enemy's back areas.

By day, bombs were dropped and many rounds fired from machine-guns on various ground targets. During the night of the 5th-6th inst., Gontrode aerodrome was successfully bombed, and two direct hits were obtained with heavy bombs on the enemy's aeroplane sheds. Other bombs burst among buildings around the aerodrome. In addition, bombs were also dropped on St. Denis Westrem aerodrome and Douai railway station.

Fighting took place yesterday throughout the day. Four hostile machines were brought down and five others driven down out of control. One German machine was shot down in our lines by anti-aircraft gunfire.

Five of our aeroplanes are missing.

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To-day another successful raid was carried out by our aeroplanes into Germany.

All our machines returned safely, but no further details have yet been received.

Dec. 7th, 9.31 p.m..—On the 6th instant the weather was again good, and enabled our aeroplanes to continue reconnaissance and photographic work over the enemy's positions, lines of communications, and aerodromes.

Hostile billets were bombed throughout the day, and a particularly successful raid was carried out against Valenciennes railway station and sidings (about 35 miles east by north of Arras), where fires were started.

In addition, every opportunity was taken of engaging the enemy's infantry in their trenches with machine-gun fire.

A great deal of fighting took place, in which five hostile machines were brought down, and three others driven down out of control.

One of our aeroplanes is missing.

Dec. 8th, 9.37 p.m.—On the 7th inst. low clouds and bad visibility made conditions less favourable for flying. Our aeroplanes observed for our artillery and carried out several low reconnaissances and the usual bombing raids. Hostile troops in their trenches were again engaged with machine-gun fire.

Very little fighting took place. One German machine was brought down and another landed intact behind our lines.

Four of our aeroplanes are missing.

Dec. 9th, 9.58 p.m.—On the 8th inst. rain prevented flying until the afternoon, when a certain amount of artillery work and reconnoitring was done.

Bombs were dropped by our aeroplanes on hostile billets and many rounds were fired from the air at ground targets.

Two of our aeroplanes are missing.

War Office Communiqués.

Dec. 4th.—The G.O.C. the British Forces in Palestine reports:

Our aeroplanes continue to bomb Turkish communications in the vicinity of Tul-Keram (23 miles north-east of Joppa) with successful results.

Dec. 5th.—The G.O.C. British Forces in Macedonia reports:—

During the past week our aeroplanes have shown very great activity. The aerodromes at Hudova (in the Vardar Valley, east of Strumnitza Station) and Drama, the railway stations at Drama and Porna, and numerous dumps and encampments have been successfully bombed. Two hostile machines have been driven down out of control.

Dec. 6th.—The G.O.C. the British Forces in Palestine reports:

On Dec. 4th one of our aeroplanes attacked two hostile reconnoitring machines escorted by four scouts; one enemy machine was driven down out of control, the remainder fled.

Dec. 9th.—The G.O.C. the British Forces in Mesopotamia reports:—

On the morning of Dec. 7th our aeroplanes bombed Tuz Kurmatli (on the Mosul Road/ 35 miles north of Kara Tepe) with good results.

Home Command Communiqués.

Dec. 6th, 1.45 p.m.—A raid by about 25 enemy aeroplanes took place early this morning.

The first group of raiders came in over Kent at 1.30 a.m. and dropped bombs at various places on and near the coast. A second group made the land shortly after 3 a.m., the various machines proceeding up the Thames and some distance into Kent.

Both the above groups appeared to have carried out preliminary attacks with the object of drawing gunfire and exhausting the defences, for it was not until an hour later that the most serious attack developed.

Between 4 and 4.30 a.m. two groups of enemy machines crossed the Essex Coast and three groups the Kent Coast, proceeding towards London on converging courses.

Their tactical plan seems to have been to deliver five simultaneous attacks on the capital from the north-east, east, and south-west.

The whole of one group, however, was turned back by gunfire, and of the others not more than five or six machines penetrated into London.

One or two explosive, and a large number of incendiary, bombs were dropped in various districts at about 5 a.m.

Two of the raiders fell victims to our defences, in each case the entire crew of three men being captured alive.

A number of fires occurred in London, but all were speedily got under control by the Metropolitan Fire Brigade.

Casualties are believed to be light, but full police reports have not yet been received.

A number of our own aeroplanes went up, and all landed safely.

4.45 p.m.—Latest police reports state that—

In the Metropolitan area three persons were killed and 11 injured in this morning's air raid.

Outside London four persons were killed, and 11 injured.

Material damage is slight.

The Casualty List.

Reported Dec. 5th.

Killed.—Cooke, Sec. Lt. G. J., Lond. R., attd. R.F.C.
Harston, Sec. Lt. W. H., North'n R., attd. R.F.C.
Heathcote, Sec. Lt. W. G., R.F.C.
Jenkins, Sec. Lt. W. E., E. Surr. R., attd. R.F.C.
Pears, Sec. Lt. C. M., R.F.C.
Platt, Lt. C. H. M., R. War. R., attd. R.F.C.
West-Thompson, Sec. Lt. M., R.F.C.

Previously reported Missing, now reported Killed.—Arnold, Sec. Lt. H. E., R.F.C.
Ormerod, Sec. Lt. A., R.F.A., attd. R.F.C.

Died of Wounds.—Hanafy, Sec. Lt S. R., R.F.C.

Previously reported Wounded, now reported Died of Wounds.—Mills, Sec. Lt. K. Le. G., R.F.C.

Wounded.—Boddy, Lt. J. A. V., R.F.C.
Coath, Lt. R. D., Yeo., attd. R.F.C.
Cottier, Capt. E. R., R.F.C.
Courtneidge, Capt. C., R.F.C.
de Pencier, Sec. Lt. J. D., R.F.C.
Duthie, Sec. Lt. D. O., R.F.C.
Mansfield, Capt. J. A., Yorks R., attd. R.F.C.
Perkins, Lt. A. C. T., M.C., R.G.A., attd. R.F.C.
Pilcher, Sec. Lt. T. F., R.F.C.
Rollo, Sec. Lt. D. J., R.F.C.

Missing.—Blackledge, Sec. Lt. E. J., L'pool R., attd. R.F.C.
Booth, Sec. Lt. W. A., R.F.C.
Howells, Sec. Lt. G. J., R.F.C.
Keller, Lt. C. F., Lond. R., attd. R.F.C.
McCash, Lt. J., Black Watch, attd. R.F.C.
Main, Sec. Lt. R., R.F.C.
Marshall, Sec. Lt. L., R.F.C.
Perney, Sec. Lt. E. D., R.F.C.
Rosenthal, Sec. Lt. A., R.F.C.

Australian Force.—Wounded.—King, Sec. Lt. W. L., Fl. Corps.

Reported Dec. 6th.

Previously reported Missing, now reported Killed.—Best, Lt. F. B., A.S.C., attd. R.F.C.
Brayshay, Capt. W. S., A.S.C., attd. R.F.C.
Bush, Capt. J. S. de L., Som. L.I., attd. R.F.C.

Missing.—Muir, Sec. Lt. Archibald, R.F.C.

Australian Force.—Died of Wounds.—Morrison, Lt. D. G., Fl. Corps.

Previously reported Missing, now reported Prisoner in German Hands.—Agnew, Sec. Lt. I. C. F., Fl. Corps.

Reported Dec. 7th.

Killed.—Wylie, Sec. Lt. A. L., M.C., R.F.C.
Young, Sec. Lt. G. J. T., R.F.C.

Previously reported Missing, believed Killed, now reported Killed.—Bamford, Lt. J. L., R.F.C.

Previously reported Missing, now reported Killed.—Binns, Sec. Lt. J. H., R.F.C.
Gunner, Sec. Lt. W. H., M.C., R.F.C.
Morris, Lt. C. H. R., Welsh Fus., attd. R.F.C.

Previously reported Missing, now reported Died of Wounds as Prisoner in German Hands.—Williams, Sec. Lt. W. H. T., R.F.C.

Previously reported Missing, now reported Prisoners in German Hands.—Bartlett, Sec. Lt. C. H., R.F.C.
Cartledge, Sec. Lt. R. A., R.F.C.
Clark, Sec. Lt. F. S., R.F.C.
Farquharson, Sec. Lt. F. B., R.F.C.
Golding, Sec. Lt. K. L., R.F.C.
Hempel, Sec. Lt. A. E., R.F.C.
Perry, Sec. Lt. B. B., R.F.C.
Whitehouse, Sec. Lt. S. L., R.F.C.

Indian Force.—Wounded.—Crocker, Lt. H. E. T., R.O., attd. R.F.C.

Canadian Contingent.—Killed.—Goodeve, Lt. S. M., F.A., attd. R.F.C.

Wounded.—Bundy, Lt. J. I., M.G.C., attd. R.F.C.
Miller, Lt. W. A., Sask. R., attd. R.F.C.
Wardrope, Lt. W. H. M., Cav., attd. R.F.C.

Missing.—McRae, Lt. J. P., A.S.C., attd. R.F.C.
Morse, Lt. T. W., Cent. Ont. R., attd. R.F.C.
Stephens, Lt. F. H., Cent., Ont. R., attd. R.F.C.

Previously reported Missing, now reported Prisoner in German Hands.—Owen, Capt. D., Gen. List, attd. R.F.C.

Reported Dec. 8th.

Wounded.—Mulligan, Sec. Lt. C. A., R.F.C.

Previously reported Missing, now reported Prisoners in German Hands.—Archibald, Sec. Lt. L. M., R.F.C.
Atkinson, Lt. J. M., A.S.C., attd. R.F.C.
Greenslade, Lt. R. S., R.F.C.

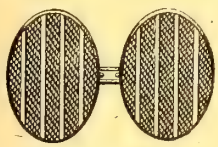
Reported Dec. 10th.

Died of Wounds.—Roxburgh, Sec. Lt. A. C., Yeo., attd. R.F.C.

Wounded.—Dunford, Sec. Lt. C. W., R.F.C.
Fielding, Lt. W. W., Yeo., attd. R.F.C.
Francis, Sec. Lt. D., Leic. R., attd. R.F.C.

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Mitchell, Lt. J. W., Yeo., attd. R.F.C.
Powell, Sec. Lt. C. M., R.F.C.

Reported Dec. 11th.

KILLED.—Dixon, Lt. C. H., R.F.C.
Pullan, Lt. J. A., Durh. L.I., attd. R.F.C.
Strettell, Lt. W. M. D. S., High. L.I., attd. R.F.C.
MISSING.—Brown, Sec. Lt. C. H., R.F.C.
Forsyth, Sec. Lt. R. A., R.F.A., attd. R.F.C.
MacKinnon, Sec. Lt. J. F., R.F.C.
Mann, Sec. Lt. W. G., R.F.C.
Noon, Sec. Lt. G., Sher. For., attd. R.F.C.

* * *

CASUALTIES AMONG N.C.O.'s AND MEN.
THE DATES ARE THOSE OF THE OFFICIAL LIST.

KILLED.

Nov. 27th.—R.F.C.—Goldsmith 65042 1st Cl. Air Mech. W. M. (Wimbledon, S.W.).

Nov. 29th.—Bradbury 51746 2nd Cl. Air Mech. G. C. (Frome); Davies 20834 1st Cl. Air Mech. M. (Leeds).

LANCERS, ATTD. R.F.C.—Willey, 3097 J. (Bristol).

Nov. 30th.—R.A.M.C., ATTD. R.F.C.—Stimpson 50120 E. D. (North Shields).

PREVIOUSLY MISSING, NOW REPORTED KILLED.

Dec. 1st.—R.F.C.—Addison 88163 2nd Cl. Air Mech. W. (Houghton-le-Spring); Backhouse 65004 Serjt. W. D. A. (Ramsgate); Stewart 3223 1st Cl. Air Mech. G. (Dundee); Wood 61869 2nd Cl. Air Mech. E. (Congleton).

DIED OF WOUNDS.

Nov. 29th.—R.F.C.—Guernsey 15998 2nd Cl. Air Mech. W. E. (Greenock).

DIED.

Nov. 28th.—R.F.C.—King 22353 2nd Cl. Air Mech P. H. T. (Cricklewood, N.W.); Tooze 49398 2nd Cl. Air Mech. W. H. (Worcester).

WOUNDED.

Nov. 26th.—R.F.C.—McLean 14237 2nd Cl. Air Mech. J. (Rothes); Middlehurst 20682 1st Cl. Air Mech. W. E. (South Ashton-in-Makerfield); Oxborough 52518 2nd Cl. Air Mech. S. G. (Swaffham); Weare 276 Serjt. M. (Axbridge); Whebby 10459 Serjt. T. J. (Misterton); Wingrove 24110 1st Cl. Air Mech. S. A. J. (Grays).

Nov. 27th.—Beadon 9975 2nd Cl. Air Mech. J. W. (Herne Hill, S.E.); Cannon 106064 3rd Cl. Air Mech. T. (Edinburgh); Cohen 58523 2nd Cl. Air Mech. H. (Mile End, E.); Cording 43257 2nd Cl. Air Mech. J. F. (Beckenham); Cousen 9142 2nd Cl. Air Mech. J. L. (Huddersfield); Gibson 8449 1st Cl. Air Mech. B. (Leytonstone, E.); Jordan 44356 2nd Cl. Air Mech. H. (Clapham Junction, S.W.); Revell 57705 3rd Cl. Air Mech. H. (Shadwell, E.); Simpson 26809 2nd Cl. Air Mech. J. (Edgware Road, W.).

Nov. 28th.—Griffiths 53095 2nd Cl. Air Mech. W. J. (Bourne, Lincolnshire); Morris 51968 2nd Cl. Air Mech. W. (Vicar's Cross); Rapley 4055 Cpl. W. F. H. (Dorking).

Nov. 29th.—Hatchman 61172 2nd Cl. Air Mech. E. (Farnworth); Hawes 53006 2nd Cl. Air Mech. P. (Portsmouth); Hayward 15426 2nd Cl. Air Mech. A. (Brixton Hill, S.W.); Honey 11441 1st Cl. Air Mech. H. E. (Lewisham, S.E.); Melhuish 59120 2nd Cl. Air Mech. F. (Birkenhead); Rose 11299 1st Cl. Air Mech. W. (Paddington, W.); Schorah 50097 2nd Cl. Air Mech. E. (Sunderland).

Nov. 30th.—Bell 10303 2nd Cl. Air Mech. J. B. (Leigh); Burn 25160 2nd Cl. Air Mech. D. (Leeds).

Dec. 1st.—Kirton 103627 2nd Cl. Air Mech. G. (Portsmouth); Norman 26692 Flt. Serjt. A. S. (Cove).

LANCERS, ATTD. R.F.C.—Smith 5461 H. (Burnley).

WILTSHIRE REGT., ATTD. R.F.C.—Snoulton 9035 C. W. (Forest Gate, E.).

MISSING.

Nov. 27th.—R.F.C.—Butler 7216 Serjt. C. J. (Mersham); Long 103725 2nd Cl. Air Mech. W. T. (Cardiff); Robertson 57731 2nd Cl. Air Mech. T. C. (Kirkcaldy).

Nov. 28th.—THE BLACK WATCH, ATTD. R.F.C.—Nicol 40368 A. (Forres).

PREVIOUSLY MISSING, NOW REPORTED DIED AS PRISONER OF WAR IN GERMAN HANDS.

Dec. 1st.—R.F.C.—Worthing 78285 G. (Cefnycrib).

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONERS OF WAR IN GERMAN HANDS.

Nov. 30th.—R.F.C.—Clear 7124 Serjt. H. L. (Bowes Park, N.); Legge 25233 Serjt. F. (Hale, Cheshire).

PERSONAL NOTICES.

DEATHS.

CAMPBELL.—Sec. Lt. Charles Bruce, R.F.C., who was killed in action on Nov. 29th, was the eldest son of Frederick Campbell, Esq., of Cooinbil, Carrathool, N.S.W. He was 27 years of age.

CAWSON.—Sec. Lt. George Adrian Cawson, R.F.C., who was killed in action on Nov. 30th, was the youngest son of George Cawson, Esq., Glanywern Lodge, Farquhar Road, Upper Norwood. He was 18 years of age.

DAVEY.—Sec. Lt. Wilfrid Davey, A.S.C., attd. R.F.C., who was killed in action on Nov. 20th after 3½ years' service, was the youngest son of Mr. and Mrs. J. T. Davey, of "Ganilly," 3, Granard Road, Wandsworth Common. Mr. Davey was 25 years of age.

GIMINGHAM.—Capt. Charles Henry Gimingham, Hertford R., attd. R.F.C., whose death was announced in THE AEROPLANE on Nov. 20th, was educated at Aldenham School, and became a chartered accountant, passing his final examination in November, 1914. In the same month he enlisted as a dispatch rider in the Royal Engineers, and obtained a commission in the Hertford R. in the summer of 1915, proceeding to the front in the autumn of that year.

After an accident to his ankle which rendered him temporarily incapable of infantry work he was attached to the R.F.C., and joined a kite balloon section at the front, where for some weeks he did the work of an observer. He then came home for training in free ballooning, and in October, 1916, was sent out to another front with a draft for a kite balloon section. For the last six months he was in command of his section. He was killed on Nov. 9th.

GRIFFITH.—Capt. Henry Hall Griffith, R.F.C., killed in an aeroplane accident in Kent on Nov. 2nd, aged 26, was the second son of Mr. and Mrs. Arthur Foster Griffith, of 59, Montpelier Road, Brighton. From Brighton College he went to Christ's College, Cambridge, where he rowed in the College boat, and was an active member of the O.T.C., Engineer Section. He took his degree in 1912, and was articled to his father, but shortly afterwards met with a severe accident to his knee which greatly incapacitated him for nearly four years. Immediately on the outbreak of war he was summoned to Chatham (with the rest of his O.T.C. comrades) to join the Scouts in the Expeditionary Force, but was rejected owing to his knee. His repeated attempts to join special sections were unsuccessful, and he went to Hendon, learnt to fly, and was then accepted for the R.F.C. He obtained his "wings" and went to France as a pilot in October, 1916. In his second flight over the German lines he and his observer were attacked by six enemy aeroplanes. They destroyed one, drove down another, and broke up the rest, his observer being seriously wounded, but a bullet through his petrol tank forced him to make the best of his way back, and in spite of the fact that his under-carriage had been shot to pieces he made a "perfect landing" just inside our lines. After nine months of active service, chiefly on observation and photographing work, he returned to England last July. He was serving at an instruction camp when he was killed.

GUY.—Lt. Christopher Godfrey Guy, Northamptonshire Regt., attd. R.F.C., whose death was announced last week, was 23 years of age. He was born at Eton in 1893, and educated at Gore Court, Sittingbourne, and at Eton, having gained a foundation scholarship in 1907. In December, 1912, he gained an open exhibition for classics at King's College, Cambridge, and went into residence in October, 1913, having decided to take up the study of medicine. In 1914 he received his commission, and soon was promoted to Lieutenant, and then temporary Captain. In July, 1915, he went with his regiment to Gallipoli, and in the following October was invalided home.

JENKINS.—Lt. R. C. Jenkins, R.F.C., who died as the result of a flying accident on Dec. 2nd at Gosport, was the second son of Mr. and Mrs. Ed. E. Jenkins, Cambridge House, Cambridge Road, East Twickenham.

PRITCHARD.—Sec. Lt. Thomas Bradley Pritchard, R.F.C., a South African, has died from injuries sustained on Nov. 20th. He was engaged in a sham fight at an aerodrome near London, and at a height of 1,200 ft. got into a spin, and, failing to recover, crashed. His observer was also injured, but is recovering.

At the inquest on Dec. 7th it was stated that Mr. Pritchard, who was an engineer in Kimberley before joining the Army, was a daring night flier. He had assisted to chase Zeppelins last month. A verdict of accidental death was returned.

STRETTELL.—Lt. William Michael Dashwood Stirling Strettell, Highland L.I., attd. R.F.C., was a student of medicine at St. Andrew's University, and a keen member of the O.T.C. there. On the outbreak of war he offered his services, and was granted a commission on August 15th, 1914, in the Highland L.I. (S.R.), being promoted lieutenant in 1915. He left for France early in May, 1915, where he was attached to the K.O.S.B. He was wounded in the arm in the fighting near Ypres, and was invalided home. While still unfit for general service he served with the 1st Garrison Battalion the Royal Scots, in both Lemnos and Egypt. He joined the R.F.C. in the autumn of 1916, and some months later acted as assistant instructor in flying at the Central Flying School, Upavon. He

(*Continued on page* 1770.)

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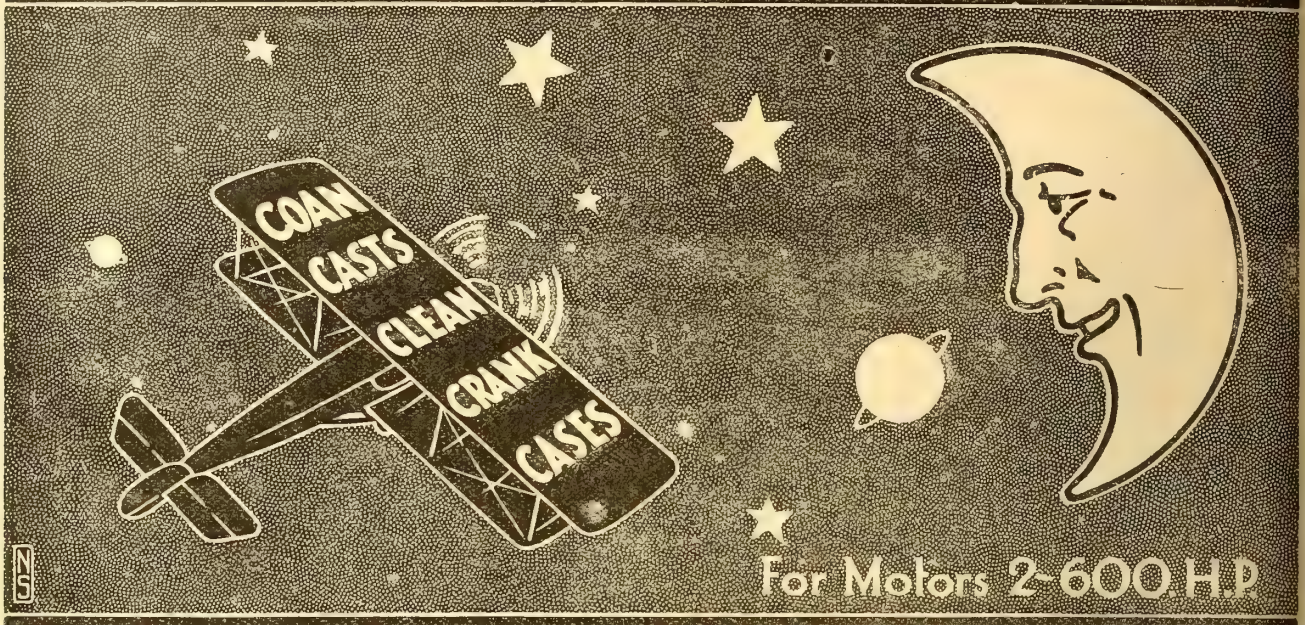
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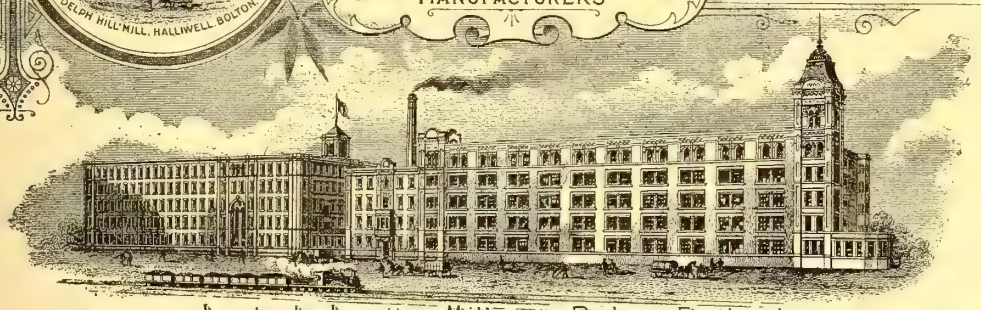
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MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.
James North Hardy & Son, Ltd., 54, Portland Street, Manchester. "Hardson, Manchester." Central 6471.

Timber—

Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Entikosil, Vic, London." Victoria 5073, 4210.
Brown, R. F., & F. W., Wollaton Saw Mills, near Nottingham. "Brown's Saw Mills, Wollaton." Nottingham 1526.
J. Owen & Sons, Ltd., 199a, Borough High Street, S.E.1. "Bucheron, London."

Time Recorders— Hop 3811 (2 lines).

Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310.

Turnbuckles—

Rubery Owen & Co., Darlaston, South Staffs.

Tyres and Wheels—

The Palmer Tyre, Ltd., Shaftesbury Avenue. "Tyricord, Westcent." Gerrard 1214 (5 lines)

Varnishes—

Clark, R. Ingham, & Co., Caxton House, S.W.1. "Pearline, Vic, London. Victoria 2923.
Harland, W., & Son, Merton, London, S.W.19. "Harland, Wimbledon 45." Wimbledon 45 and 1395.
Naylor Bros., Ltd., Southall, Middlesex. "Naylor, Southall." Southall 30.

Washers—

Avenue 1432.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3.
Herbert Terry & Sons, Ltd. Redditch. "Springs, Redditch." Redditch 61.

Watchmakers and Jewellers (Silver Models)—

Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 0091 (3 lines).

Welding and Cutting Plant—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Welding Repairs—

Barimar, Ltd., 10, Poland Street, W.1. "Barimar, Reg, London." Gerrard 8173.
The New Welding Co., 26, Rosebery Avenue, London, E.C.1. "Windoneeda, Holb, London." Holborn 5252.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London."

Wind Shields— 3540 Victoria (3 lines).

Auster, Ltd., 133, Long Acre, W.C. "Winflector, London." Regent 5910.
London Label Co., Ltd., Hadley Works, Beckton Road, E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Wire Gauze—

N. Greening & Sons, Ltd., 16, Finsbury St., London, E.C.2. "Seiscrew, Finsquare, London." London Wall 1082.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

Wires and Cables (Aeroplanes)—

Bruntons, Musselburgh, Scotland. "Wiremill, Musselburgh." Musselburgh 28.
Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466

Wirework— (3 lines).

Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Woodworking Machinery—

Robinson, Thomas, & Son, Ltd., Railway Works, Rochdale. "Robinson, Rochdale." Rochdale 467.
Sagar, J., & Co., Ltd., Halifax. "Sawtooth, Halifax." Halifax 136.
Wadkin & Co., Leicester. "Woodworker, Leicester." Leicester 1614.

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Acetylene Welding Plant—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flammo, Vic, London." Vic 3830.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Aeroplane Manufacturers—

Aircraft Manufacturing Co., Ltd., Hendon. "Airmanship, Hyde, London." Kingsbury 180.
Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne." Gosforth 500.
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.
British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol." Bristol 3000.
British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudroplan, Crickle, London." Hampstead 5451.
Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6. Hampstead 4403 and 4404.
Davidson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1144-1145
Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1176.
Grahame-White Aviation Co., Ltd. London Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 120.
Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophid, Crickle, London." Hampstead 7420.
Mann, Egerton & Co., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
Martinsyde, Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge." Woking 331; Byfleet 171.
National Aircraft Co., Ltd., 15, Hackney Road, N.E.2. London Wall 6725.
"New Inventions" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London." Willesden 2455.
Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48.
The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis, London." Putney 2240-2241.
Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester." City 8530-8531, Manchester.
Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes." Cowes 193.
Short Bros., Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London" Regent 378.
Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston." Kingston 744.
Standard Aircraft Manufacturing Co., Effingham House, Arundel Street, W.C.2. "Gunsigarush, Estrand, London." City 80.
Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickersfyta, Knights London. Kensington 6810.
Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil" Yeovil 129.
White J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes." Cowes 3

Airships—

Wimbledon 1314.
Airships, Ltd., High Street, Merton.
Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, 'Phone, London" Regent 378.

Aluminium Castings (Sand & Die)

Coan, R. W., 219, Goswell Road, London, E.C.1 "Reankases, Isling, London." City 9846.

Bearings (Etonia Cast Phosphor Bronze)—

Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3027.

Brass Sheets for Tipping Propellers—

Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London" Avenue 695, 906, and 7006.

Buildings—

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation Norwich" Norwich 851.
Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313
Rubery Owen & Co., Darlaston, South Staffs.
The Wilfley Co., Ltd., Salisbury House, London Wall, E.C.2. "Wrathless, Phone, London." City 2681-2

Cable Coverings and Cable Controls—

Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Capstan Work—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Carburettors—

Hobson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.

Casein—

Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3. "Suricdon, Fen London." Avenue 34 & 35.

Castings—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Castings (Aluminium, Brass, Bronze, Machined or, Rough)—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Celluloid (Non-Flam.)—

Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7.
London Label Co., Beckton Road, E.16. "Lonlabel, Canning, London." East 1300.

Clothing—

Burberry's, Ltd., Haymarket, S.W.1. Regent 2165.
Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6.
Hazel & Co., 4, Princes Street, Hanover Square, W.1. Mayfair 4071-2.
Robinson & Cleaver, Ltd., Regent Street, London, W.1. Gerrard 1070.

Component Parts—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (4 lines).
B. D. V. Aircraft Spares, Syon Chambers, 162, Kew Road, Richmond, Surrey. "Aeros, Richmond." Richmond 1081.
Central Aircraft Co., Palmerston Works, High Rd., Kilburn, N.W.6. Hampstead, 4728.
Evans, Joseph, & Co., Ltd., Liverpool Street Mills, Birmingham. "Adept, Birmingham." Central 733 (3 lines).
The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aercreasos, Canning, London." East 1300.
The Osborne Aircraft Co., Ltd., Whin Hill, Greenock, Scotland. "Cordage, Greenock." Greenock 618.

Cords, Tapes, and Threads—

MacLennan, J., & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.

Dopes—

British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312.
British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellutate, London." Regent 4046.
Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawb, London." London Wall 5350-3622.
Clark, Robert, Ingham & Co., Ltd., Caxton House, S.W.1. "Pearline, Vic, London." Victoria 2923.

Electrical Accessories—

Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 1564.
Mann, Egerton & Co., Ltd., 127, Cleveland Street, London, W.1. "Installing, Euston-road, London" Museum 70.
Premier Electric Heaters, Ltd., 258, 259, and 260, Bradford Street, Birmingham. "Fahrenheit, Birmingham." Midland 981.

Electric Cables—

E. Kalker & Co., Coventry. "Kalker, Coventry." Coventry 24x.
Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 1564.

Electric Lighting and Power—

E. Stanley Fardon, A.M.I.E.E., 67, Mosley Street, Manchester.
Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 1564.

Engines and Parts—

Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford. "Pump, Bedford." Bedford No. 1.
Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.
The Beatty School of Flying, Ltd., The Broadway, Cricklewood, N.W.2. Hampstead 3000.
Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London." Gerrard 238.
Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London S.W.1. "Aeroflight, Vic, London." Vic 7026.
Evans, Joseph, & Co., Ltd., Liverpool Street Mills, Birmingham. "Adept, Birmingham." Central 733 (3 lines).
Gordon Watney & Co., Ltd., Weybridge. "Mercedès, Weybridge"
Weybridge 550 (7 lines).
Green Engine Co., Ltd., Twickenham. Richmond 1203
Gwynnes, Ltd., Hammersmith Iron Works, Hammersmith, W. "Gwynne, Hammersmith." Hammersmith 1910.
Napier & Son, D., Ltd., 14, New Burlington St., London, W., and at Acton, W. "Nitrifier, London." Gerrard 8926.
Robertson, J. H., & Co., 1, Albemarle Street, London, W.1. Regent 3006.
Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1. "Rollhead, London." Gerrard 1654-56.
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.

Engines and Parts (continued)—

Sturtevant, B. F., Co., Ltd., Hyde Park, Boston, U.S.A.
Sunbeam Motor Car Co., Ltd., Wolverhampton. "Moorfield, Wolverhampton."
The Gnôme & Le Rhône Engine Co., Ltd., 47, Victoria Street, S.W. "Clevelash, London." Wolverhampton 96; Walthamstow 898 (2 lines).

Flare Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Flexible Shafts—

Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Flying Schools—

Bournemouth Aviation Co., Ltd., Talbot Village, Bournemouth. "Etches, Winton." Bournemouth 340.
Cooke's (Finsbury), Ltd., Finsbury Pavement House, London, E.C.2. London Wall 573 and 6729.

Galvanising—

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.
The Rustless Iron (Cowper Coles Patents), Ltd., 11, French St., Sunbury-on-Thames, Middlesex. Sunbury 37.

Gears—

Moss Gear Co., Ltd., Thomas Street, Aston, Birmingham. "Mosgear, Birmingham."

Glue—

East 407.
Central Chemicals, Ltd., 283, West End Lane, London, N.W.6. "Entramical, Westhamp, London."
Improved Liquid Glues Co., Ltd., Gt. Hermitage Street, E. (Croid.). "Excridex, Wapp, London." Avenue 3138.
Mending Co., 8, Arthur Street, E.C. Bank 5870.
Oldroyd, Wm., & Sons, Ltd., 9, Minning Lane, E.C.3.

Goggles—

Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Heating and Ventilating—

Chas. P. Kinnell & Co., Ltd., 65 & 68, Southwark Street, London, S.E.1. "Kinnell, London." Hop 372 (2 lines).

Hollow Spars—

McGruer Bentwood Hollow Spar Co., Commercial Wharf, Lamberth, S.E. "Gabrielson, Watloo, London." Hop 718, 719, and 3358.

Instruments—

British Wright Co., Ltd., 33, Chancery Lane, W.C.2. Holborn 1308.

Instruments (Scientific, Altimeters, etc.)—

The Cambridge Scientific Instrument Co., Ltd., Cambridge. "Instrument, Cambridge." Cambridge 642.
Short & Mason, Ltd., Macdonald Road, Walthamstow, E.17. "Aneroid, Phone, London." Walthamstow 282.

Machine Tools—

Brewster & Co., 11, Queen Victoria Street, E.C.4. "Circumfuse, Cannon, London" City 768.

Magneto Driving Pieces—

Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Magnetos—

The M-L Magneto Syndicate, Ltd., Victoria Works, Coventry. "Corlton, Coventry." Coventry 1008-009.
The British Lighting & Ignition Co., Ltd., 204, Tottenham Court Road, W.1. "Wickmag, Phone, London." Museum 470.

Metal Manufacturers—

Birmingham
Clifford, Chas., & Sons, Ltd., Birmingham. Central 1243.
"Clifford, Birmingham."
Evans, Joseph, & Co., Ltd., Liverpool Street Mills, Birmingham. "Adept, Birmingham." Central 733 (3 lines).

Metals in General—

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.
Samuel Mercer & Co., 198, Upper Thames Street, E.C.4. "Reconciled, Canon, London." City 6412.
Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London" Avenue 695, 906, and 7006.

Metal Parts and Fittings—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
Aircraft Supplies Co., Ltd., Ascot House, 125, Long Acre, W.C.2. "Upcush, London." Gerrard 276 (2 lines).
Arnott & Harrison, Ltd., Blythe Road, Willesden Junction Willesden 2010.
Bayliss, Jones & Bayliss, Ltd., Wolverhampton. "Bayliss, Wolverhampton" (Bolts and Nuts.) Wolverhampton 1040.
Bolton, Thos. & Sons, Ltd., 45, St. Charles Street, Birmingham. "Handicraft, Birmingham." Central 1788.
Blackburn Aeroplane & Motor Co., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

Metal Parts and Fittings (contd.)—

Bolton Gold Shell Ring Co., Ltd., Inverness Road, Hounslow, London. "Golshel, Hounslow." Hounslow 254.
Brown, J. & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.
Burgess & Co., Ltd., 127, Cleveland Street, London, W.1. "Installing, Euston-road, London." Museum 70.
Clifford, Frederick, Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." Kings Norton 261
Dawson, J. H., & Co., 1, Albemarle Street, London, W.1. Regent 3906.
Evans, Owen, & Co., Ltd., Darlaston. "Roofs, Darlaston" Darlaston 87.
Evans, Joseph, & Sons, Ltd., Wellington, Shropshire. "Sankey, Wellington, Salop." Wellington 66.
Folsom Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.
General Construction Co., Harley Works, Beckton Road, E.16. "Aercreasos, Canning, London." East 1300.
Gibbons Bros., Ltd., Bradley, Bilston. "Gibbons, Bilston." Bilston 10.
Hampson Bros., Bilston. "Hampson, Bilston" Bilston 10.
Hele Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10.

Metal Shearing Tools—

Hall, Smith, & Co., Ltd., Tangent Works, Keynsham, near Bristol. "Inkeynsham 21.

Metal Spinnings—

Hall & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Metric Bolts—

Holmes Bros., Zota Works, Hildreth Street, Battersea, S.W. Battersea 415.
Hunt Owen & Co., Darlaston, South Staffs.

Miscellaneous—

Harland, D. & Son, Ltd. (Roofs), Belfast. "Belfast, Belfast." Belfast 4633-4034-4035.
Hill-Blare Glass Co., Ltd., 76, Turnmill Street, E.C. Central 3731.
Hogden Wire, Ltd., Willesden Junction, "Boardelm, Harles, London." Willesden 2400 (3 lines).
Hunt & Mital (Kingston), Ltd., Kingston-on-Thames.
Jones Bros. Ltd., Great Eastern Street, E.C. "Imbrowned, Bethroad, London." London Wall 6300.
Kirkhill Manufacturing Co., Ltd., 613, Fore Street, London, E.C.2. Labels in Metal, Horn, or Horide.
Lakes Brad Co., Ltd., Chapel-en-le-Frith, Manchester, Birmingham." Central 793.
Lonlabel Manufacturing Co., Ltd., 211, City Road, E.C. City 9558.
Lonlabel Co., Ltd., Hadley Works, Beckton Road E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.
Mann, J., & Co., 30, Newgate Street, E.C.1, and at Glasgow. Tapes, Cords and Webbing. City 3115.

Motor Cars—

Mocar, Ltd., Dumfries. "Mocar, Dumfries" Dumfries 281-282.
Mann, Egerton & Co., Ltd., 370/381, Euston Road, London, N.W.1. "Manegecar, Euston, London." Museum 70.
Morris Motor Co., Coventry. "Flywheel, Coventry." Coventry 530 (4 lines).

Name Plates and Labels—

Hunt & Mital (Kingston), Ltd., Kingston-on-Thames.
Kirkhill Manufacturing Co., Ltd., 613, Fore Street, London, E.C.2.
Lakes Metal Engraving Co., Chatsworth Road, Worthing. "Clegg Worthing."

Observation Panels—

Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Parachutes—

Pollock's Aerial Patents, Ltd., Eldon House, Eldon Street, London, E.C. "Pollavo, Ave, London."

Patent Agents—

London Wall 3266-3267.
Patent Agency, 165, Queen Victoria Street, E.C.4. Central 682.
Pollington, 27, Chancery Lane, E.C.4. Central 332.
Popplewell & Co., 38, Chancery Lane, Central 1763.

Pattern Making—

Wood, 6, 7 and 8, Allsop Street, Upper Street, W. Padd 4743.

Petrol Storage (Bulk)—

Petrol & Co. (The Hydraulic System), Grove House, Kingsway, London, W.C.2. "Petrolrit, London." Gerrard 2220.

Piston Rings—

Wellworthy Piston Ring Co., Coventry. Coventry 723.

Power Presses and Dies—

Pratt, W. & Co., 22a, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon, London." Hop 4340.

Presswork—

Rubery Owen & Co., Darlaston, South Staffs.
Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851
Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.
Integral Propeller Co., Ltd. "Aviprop, Hyde, London." Hendon 9, Kingsbury 104.
Lang Propeller, Ltd., Weybridge. "Aerosticks, Weybridge." Weybridge 520-521.
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich" Norwich 482 (4 lines).
Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 291, Leeds.
Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

Pyrometers—

The Foster Instrument Co., Letchworth, Herts. Foster Instruments, Letchworth. Letchworth 26.

Rigging for Aircraft—

Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466 (3 lines).

Rubber Tubing & Accessories—

Hancock, James Lyne, Ltd., 266, Goswell Road, London, E.C.1. "Masticator, Isling, London." City 3841 and 3842.

Safety Belts—

Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432.

Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay, 345 (3 lines).
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.
Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.
Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton." Southampton 1337.

Searchlights and Landing Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Seats for Aeroplanes—

Bowser, E., Art Cane Works, 50 Park Lane, Leeds. Central 3437.

Shackles—

The British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow. "Golshel, Hounslow" Hounslow 254.

Sheet Metal Pressings—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.
W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk, Bham." Central 550.
British Metal (Kingston), Ltd., Kingston-on-Thames.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 497 Birmingham.
Rubery Owen & Co., Darlaston, South Staffs.

Sheet Metal Work—

Thames.
British Metal (Kingston), Ltd., Kingston-on-
Evans, Joseph, & Co., Ltd., Liverpool Street Mills, Birmingham. "Adept, Birmingham." Central 733 (3 lines).
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Rubery Owen & Co., Darlaston, South Staffs.
The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.

Shock Absorbers (Elastic Cord)—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Sparking Plugs—

Forward Motor Co., Summer Row, Birmingham. Central 6250.
Hobson, Manufacturing Co., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.
Lodge Sparking Plug Co., Ltd., Rugby. "Igniter, Rugby." Rugby 235.
Ripault, Leo, & Co., Ltd. (Oleo Plugs), 629, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758.

Stampings—

Avenue 1432.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3.

Springs—

Dart Spring Co., West Bromwich. "Dart, West Bromwich." West Bromwich 322.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Steel—

Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.
Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham." Smithwick 224.

Steel Tension Wires—

Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466

Steel Tubes for Aeroplanes—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Taper Pins—

Mountford, Fredk. (Birmingham), Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262.

Tapes and Smallwares—

Brown, Percy, & Co., 49, Newgate Street, London, E.C.1. "Ominate, Cent, London."
MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow City 3115.
James North Hardy & Son, Ltd., 54, Portland Street, Manchester. "Hardson, Manchester." Central 6471.

Timber—

Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Entilcoil, Vic, London." Victoria 5073, 4210.
Brown, R. F., & F. W., Wollaton Saw Mills, near Nottingham. "Brown's Saw Mills, Wollaton." Nottingham 1526.
J. Owen & Sons, Ltd., 109a, Borough High Street, S.E.1. "Bucheron, London."

Time Recorders—

Hop 3811 (2 lines).
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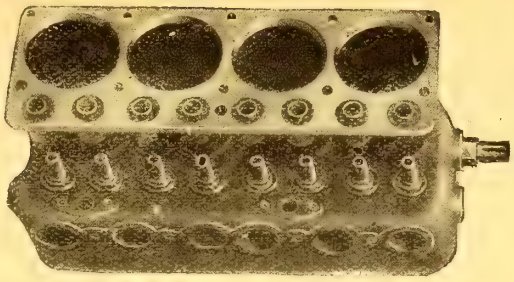
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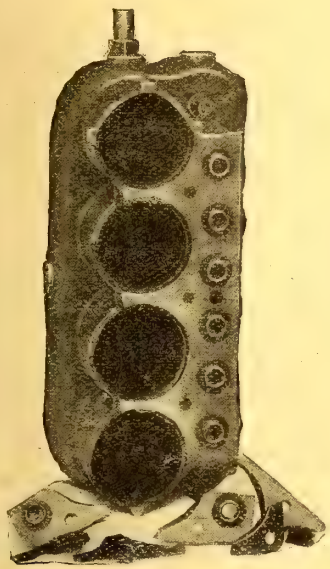
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FROM THE LIST OF CASUALITIES IN THE AEROPLANE OF 21st. NOV., 1917.

CROOKE and RUSSEL.—An inquest was held on Nov. 14th on the bodies of Lt. Walter Crooke, R.F.C., aged 18, and Lt. J H. Russel, R.F.C., aged 27, whose deaths, as the result of a collision were announced last week.

The evidence showed that four machines were manœuvring into close formation. Three got into position and Mr. Crooke made a dive to come up with the rest. He apparently did not note that the squadron leader had somewhat altered his course, with the result that his machine struck the fuselage of Mr. Russel's machine, and both fell out of control from a height of 5,000 feet, the two pilots being killed. A verdict of accidental death was returned. Sec. Lt. Walter Crooke, R.F.C., was the son of Mr. and Mrs. Walter Crooke, Priors Lee, Shifnal.

(This is evidently a case in which parachutes might have saved lives.—Ed.)

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In the fullness of time and with a sufficiency of fatal casualties, a Parliamentary Committee will be appointed to enquire into the appalling wastage of our Aviators on the Training Grounds (800 since 1st January, 1917), and the means that may exist for its avoidence or abatement. It will find and report that

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That it should embody an effective shock-absorber.
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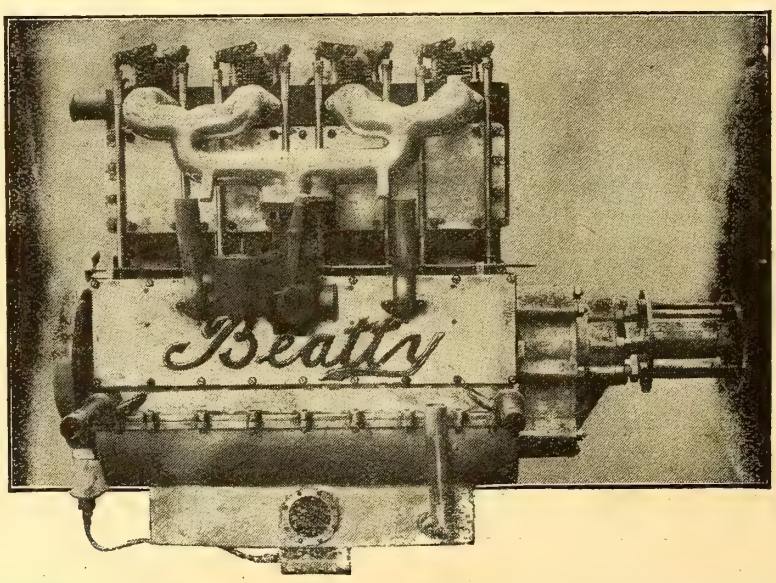
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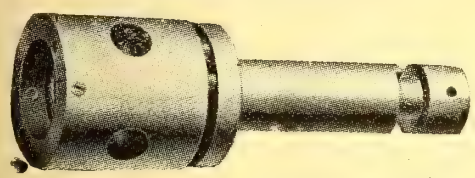
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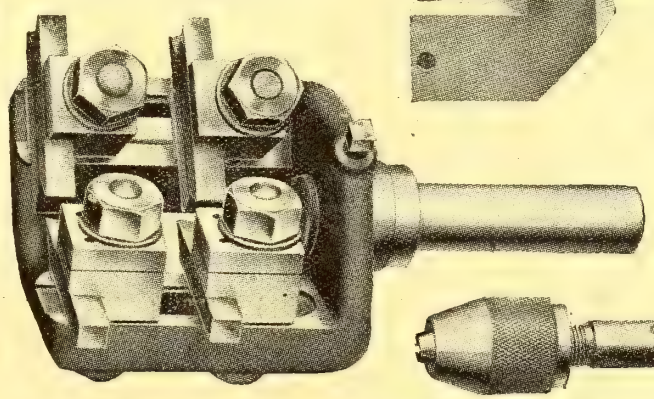
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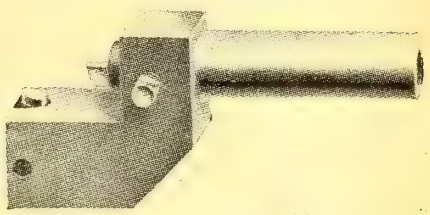
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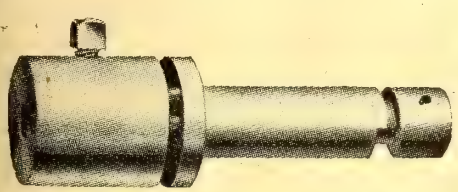
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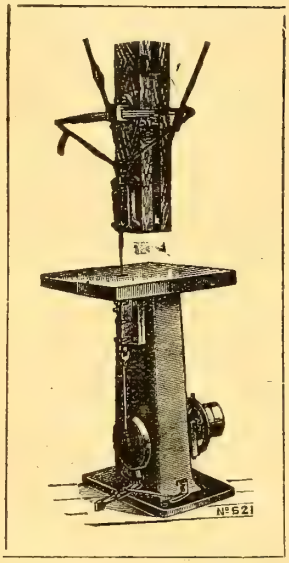
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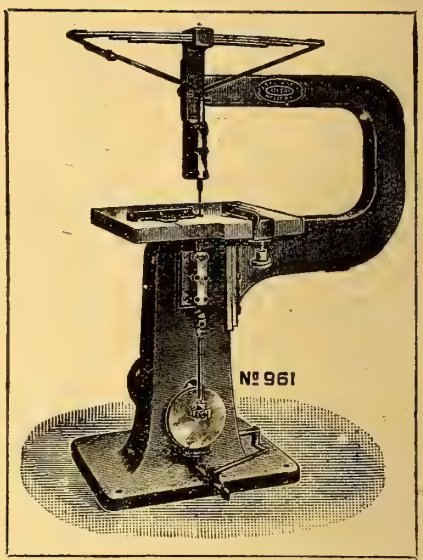
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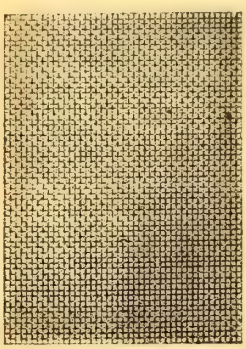
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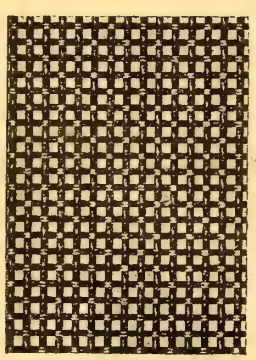
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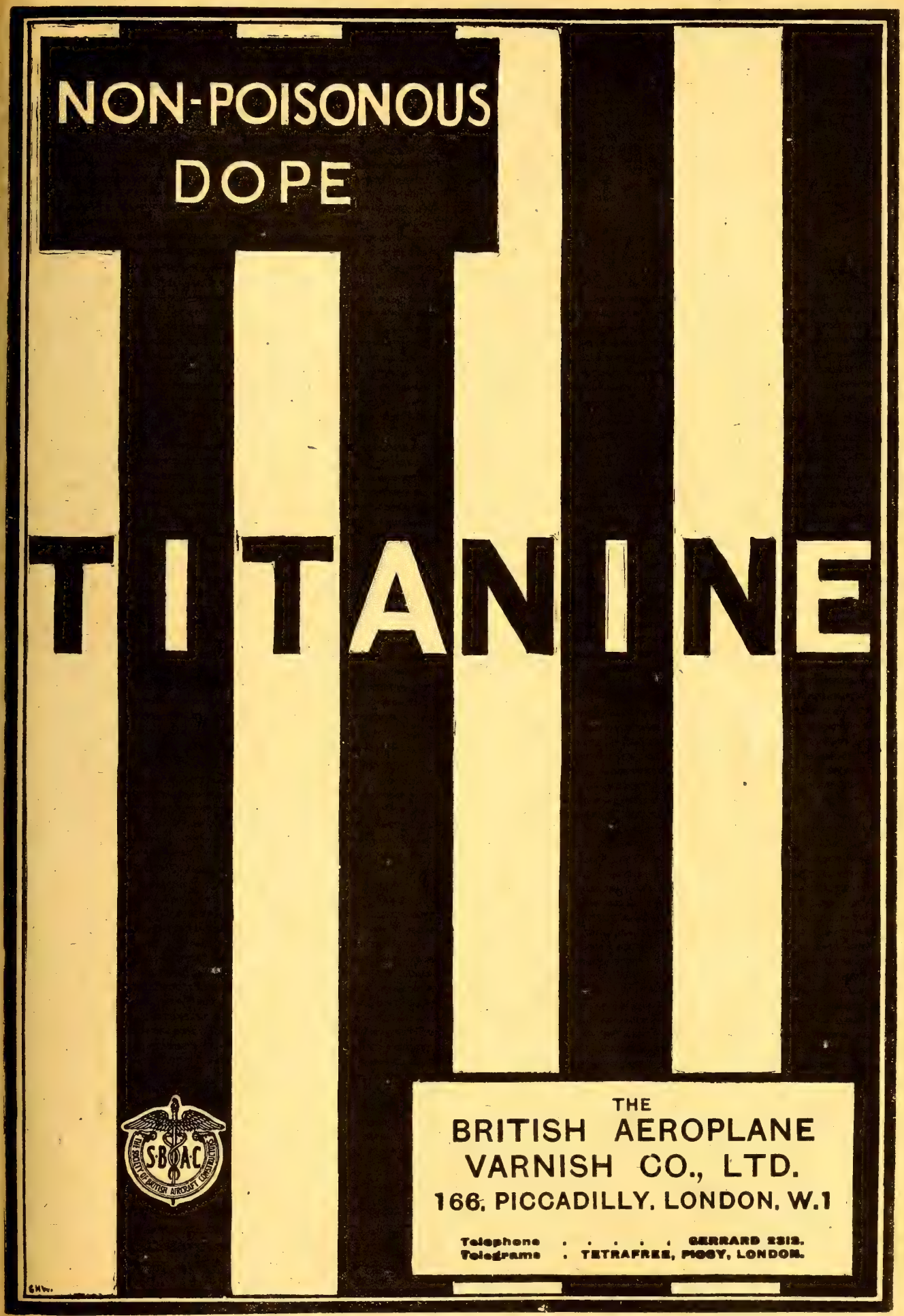
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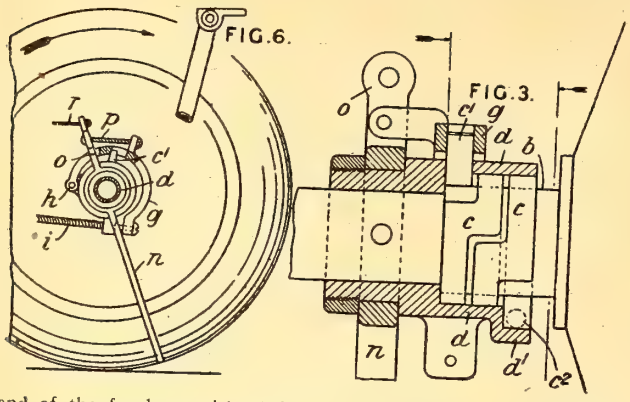
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end of the fuselage with a view to preventing the machine from tilting forwardly. The ends of the members *n* may be shaped as skids or provided with rollers. The hand-lever for operating the brakes is preferably telescopic to allow for the movement of the wheels when the shock-absorber comes into action. According to the Provisional Specification, forward tilting of the machine may be prevented by providing a spring-controlled plunger carrying a wheel adapted to contact with the ground. Specification 110,534 is referred to.

A WORKER'S VIEW.

[The following letter is published so as to give another view of the eternal labour question.—Ed.]

Sir,—If you will allow me, I should like to state my experience as an operative woodworker in three aeroplane works, one of the three being pioneers in the industry, being established some ten years ago, and employing at the present time some thousands of hands. Of the other two, one employed about 400 and the other 600 hands at the time I was with them. In all probability they employ more now, as they were in both cases taking larger premises.

I wish chiefly to deal with the management and with the position of the skilled and industrious operative, both of which matters are capable of very considerable improvement. Managers, so far as my experience goes, do not manage, and the skilled and industrious workman is neither given a chance for his skill nor scope for his industriousness.

He seems to be regarded as a sort of Pariah by a majority of the workers, who seem to regard anything in the shape of energy as sycophancy. The fact that it is possible to be actuated by a sense of duty is incredible to many of them. While this of itself does not really matter, it is not altogether pleasant, especially so as the men who sling unpleasant epithets around are for the most part army dodgers. If one can forgive them for avoiding an obvious duty in one respect, one expects them to do it in another, and so far as my experience goes, they do not do it.

The management is to blame to a very large extent for this as, under proper and skilful management, work-dodging would not exist. The work-shy is as a rule made so by circumstances.

If he has over him a manager who knows what a fair day's work is, and insists on having it, the manager generally gets it without much trouble. The manager will be heartily cursed behind his back, though probably fawned on before his face by a certain type of workman, but this does not matter a rap, and the manager or foreman worthy of the name will not keep awake o' nights on this account.

I am certain aeroplanes can be made quicker and *better* than they are at present, but, for this to eventuate, infinitely better management is required and good men, and there are plenty of them, given some encouragement. They should not be, as they are now, simply put into a gang, and, notwithstanding what ability they possess, kept for months tacking on a bit of three-ply, boring holes, or some similarly uninteresting job. Sometimes they are not even found that to do, for they do not always get anything to do.

Such is the farce and fallacy of management as at present, that so long as a man appears to be busy, and any fool can do that, it is all that is required. The management never seem to be able to analyse the amount of work done in a day or a week by a particular man.

A case that came under my own notice will illustrate what I mean. I was one of a number on a fuselage in course of erection. My duties were to put in the control wires on one side, while my mate put in the other side, a job that could easily be done, or the part of it we had to do, in three hours, but if our stuff came along all right, we had to take six hours on the job.

One day a workman engaged in another job on the fuselage did not come in, and the foreman asked me to do his job also. I was really rather glad to do it, as it kept me a bit busier. Whether the man left altogether, or whether he was put into other work, I don't know, but I was kept on the two jobs, and for a considerable time was sneered at by my fellow workmen for doing it. But as, when occasion requires, I can give a Roland for an Oliver, I, on the whole, enjoyed it.

The foreman, in common with others I have encountered in this business, mistook buzzing around for real work and crowded more men on a fuselage than were able to carry out their respective jobs without being in each other's way, and one day, when I stood aside for a minute or two to let some other man do his part, the foreman came in a towering rage, real or assumed, and peremptorially demanded why I did not do the work and not look at it. This, despite the fact that I was, and had been for some days, doing the work of two men. Mr. Foreman had the very liveliest five minutes of his life. His manner to me afterwards was one of apologetic dejection, so much so that I left the place in disgust a week or so later.

Another time I was given some toe-pieces, for the wind screen, to make. A sheet or so of three-ply, a block of wood something like an enlarged horse's hoof, and a contraption of sheet iron were supplied to me; I ventured to suggest it would be quicker and more accurate if the things were properly developed and a pattern cut, and asked for a sheet of paper for this purpose. To set out and develop it would have taken about an hour, and, as the pieces to be made were circular in plan, setting on an inclined plane onto a circular hood, it was the only correct way of doing the job. The manager told me pretty sharply he did not want any new-fangled notions, and I was to make the things as they had been made before.

I hope this will catch the eye of some old joiner, long since retired from active service. It will at least bring a smile to his serrated features. Developing a circle on a circle new fangled! Ye gods!

I proceeded to make them as before, taking six times more time and material than ought to have been.

The two instances I have given are typical of the chaos that passes for management, so far as my experience has gone in aircraft factories.

Will the same sort of thing happen when the industry is placed on a commercial basis and aeroplanes are made, as they will be in peace-times, about the same as motor-cars were before the war? I affirm they will not. Then why in the name of reason, at a time when they are more urgently and more vitally needed, are these conditions allowed to prevail, and who is to blame? It seems to me the blame is not difficult to fix.

Just one other instance that came under my notice, and I have finished. While I was at one of the works, an Army officer addressed the operatives and told his story in a plain, manly way. Every word he uttered carried conviction. Amongst other things he narrated was an account of a fight in the air between several German planes and one of our own. The Germans were too many for our man and brought him down, but he managed to crash his machine within our own lines. So short of material were our people that attempts were made to salve every bit of wood and every scrap of metal from that wreck for the purpose of repairs. To some extent they succeeded, but as the Germans shelled the wreck daily, this was done only at very grave risk. To use his exact words, which I hear as I write, and shall remember as long as I have being, "We had casualties on that job. Men were killed."

(Signed) "AN OLD HAND."

[Is it necessary to have men killed in salving wrecks when harder and better work at home would make such salvage risks unnecessary?—Ed.]

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Radiation Pyrometers, catalogue P. 17.
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THE AIRCRAFT TRADER

MARKET TOPICS.

Prices given are for quantities on usual terms.

COPPER.—Authentic information from the U.S.A. is very scarce. The authorities, however, do not yet appear to have fixed any definite scheme for distribution, and the question of prices is still causing confusion and uncertainty, although it is reported that permission has been given dealers to charge 5 per cent. on their cost when fixing sales. In any case, the U.S. Government's arrangement with producers is not at all clear; otherwise it would not have been necessary for a further notice to be issued explaining why prices are being controlled. The chief points in this reported declaration are as follows :—

1. To enable the Government, or the public, or both, to purchase at prices below those established by market conditions.
2. To substitute for the ordinary method of distribution by price, a method of distribution of product on a basis of the country's requirements in connection with the prosecution of the war.
3. To prevent the making of large profits out of the war and thereby, amongst other things, to eliminate a cause of great discontent on the part of labour.

It is quite evident that producers expect the authorities to increase the official price in 1918, as several of them are quoting an extra 2½ cents for 1918 deliveries.

The output of Copper is steadily increasing and the mines appear to be settling down to regular work.

The position here is unchanged, lacking any spark of interest whatever.

Comparative Prices.

Present Price	£110 per ton.
Last Year	151 per ton.
Highest Price, 1916	153 per ton.

TIN.—Prices are still soaring and there does not appear to be any prospect of the market becoming any easier, furthermore supplies are far from satisfactory, and unless there is a distinct change very soon there is bound to be a most acute shortage.

As will be observed from perusal of the comparison of prices below, the price of Tin at the beginning of November was £260, and there has, therefore, been an advance of approximately £33 10s. in a month.

Comparative Prices.

December 4th	£293 10 0
November 29th	290 0 0
Last Month	260 0 0
Last Year	189 5 0
Average Price, 1916	182 0 0

LEAD.—The only item of interest this week is the astounding fact that it has suddenly dawned upon the authorities that there must be a considerable quantity of Scrap Lead about the country, which is lying idle, and the L.G.B. are pressing local authorities to see that all Scrap is watched very carefully There is just about enough material available for war requirements.

TIMBER.—Further, to the remarks in last week's report on the shortage of Silver Spruce. The five suggested causes of the present crisis ought to be supplemented by two others, which are quite as important as those already mentioned :—

1. Failure to give permission for a substitute to be used on School machines.
2. Failure to carry out a drastic reformation of the A.I.D. inspection of wood parts and units.

Regarding No. 1.—There appears to be no reason whatever why this should not have been done twelve months ago. It is well known that Farman built his first machines from common deals, and they certainly did good service, and, if it was not considered desirable entirely to eliminate Silver Spruce on School machines, why were instructions not given for the stocks of Silver Spruce to be conserved, and a substitute wood used for the lesser important parts? There is no doubt whatever that if this had been done twelve or even nine months ago, the extra amount of Silver Spruce available for fighters would have been considerable.

Regarding No. 2.—It would be interesting to know if the authorities have taken steps to see that all factories are utilising rejected spars, struts, and other large parts for smaller parts. Furthermore, and this is a very important point indeed, has it ever occurred to the officials that a considerable quantity of Silver Spruce could be saved if the colossal quantity of wood which is rejected as being unsuitable for fighters, because it does not comply with the very rigid standard set up by the A.I.D., was, instead of being scrapped, cut up and utilised on school machines.

Another step which, if taken, would have saved an appreciable amount of wood, is the grading of the Standard of Inspection. The most inexperienced and unreasonable expert must admit that it is totally absurd to carry out the same microscopical inspection on a packing piece, as is usual on a spar.

Finally, there is no doubt whatever, that the present unfortunate shortage of Silver Spruce could have been averted, had the officials nine months ago, taken into their confidence practical men who have been inspecting and cutting up timber for aeroplanes for the past seven years, also Timber merchants who have handled the timber for the same period, and supplied the aircraft pioneers in the days of struggle and adversity. The reader is left to arrive at his own conclusions, but there is not the slightest doubt whatever that the crisis, which is not yet past, could and should have been averted.

There has been some very acceptable shipments of Silver Spruce arrive recently, and good supplies of this wood and its substitutes should be available during the next three months. Prices continue very firm.

FABRIC.—Supplies are now coming through very nicely. Prices are very firm, although it would not be surprising to see a still further advance during the next month or so.

CURRENT MARKET PRICES.

Dec. 6th, 1917

The prices given below are the prices ruling on the above date.

Terms.—Usual for the various materials mentioned.

Prices of old metals are as quoted by scrap dealers.

Prices must not be taken as specific quotations for definite quantities delivered to any part of the country.

Aluminium.*

Ingot	£225 per ton.
Remelted	£210 per ton.

Brass.

Sheets	15⅛d. per lb.
Strip	14⅝d. per lb.
Wire	14½d. per lb
Tubes	15¾d. per lb.
Castings	15d. per lb.
Turning Rod	14d. per lb.
Brazed Tubes	19½d. per lb.

Copper.

Ingot, Standard, Cash	£110 per ton.*
Ingot, Standard, 3 mos.	£110 per ton.*
Best Selected (Nett)	£123 to £119 per ton.
Sheets	£147 per ton.
Wire	15½d per lb.
Tubes, S.D.	18½d. per lb.
Tubes, Brazed	18½d. per lb.
Rivets	1s. 10½d. per lb., basis.
Tacks	1s. 10d per lb.

Fabric.*

Linen, R.A.F., 17C, Spec., 36 in. wide, 2s. 8d. p. yd.
Linen, R.A.F., 17C, Spec., 38 in. wide, 2s. 9½d. p. yd.
Spaced, R.A.F., 17C, Spec., 37½ in. wide, 1s. 9d. p. yd.

Gun Metal.

Castings	1s. 8d. per lb.

Lead.

Virgin Pig	£29 per ton. c.i.f.
Virgin Pig	£30 per ton, ex stores.
Sheets	£39 10s. per ton, D/d.
Pipes	£40 per ton.
Dry White	£46 10s. per ton, less 5 per cent.
White in Oil	£53 per ton. (lots over 5 cwt. less 5 per cent.)
White in Oil	£55 per ton. (lots under 5 cwt. less 5 per cent.)
Red	£42 per ton, less 2½ per cent.

NICKEL.*

Nickel .....£200 per ton.

PHOSPHOR BRONZE.

Ingots, 5 cwt., and under.....£154 to £175 per ton.
(Subject to Copper and Tin Fluctuations.)
Castings .....1s. 7½d. to 1s. 9½d. per lb.

PHOSPHOR COPPER.

Ton lots .....£200 to £205 per ton.

SILVER.

Silver .....42¾d. per oz.

SOLDER.

Plumber's .....120s.
Tinman's .....165s.

STEEL.*

High Speed, 14 p. cent., Tungsten, 2s. 10d. per lb., basis.
High Speed, 18 p. cent., Tungsten, 3s. 10d. per lb., basis.

ALLOY STEELS TO AIR BOARD SPECIFICATIONS.‡

Round and Square :—

Specification No. S2	£86
Specification No. S2 (bright-drawn)	£115
Specification No. S8	£86
Specification No. S10	£70
Specification No. S12	£75
Specification No. S14	£43
Specification No. S15	£70
Specification No. S16	£70
Specification No. S17	£75
Specification No. S18 (oil-hardened)	£86
Specification No. K1	£75
Specification No. K2	£75
Specification No. K3	£86

The above prices are for ¼ in. to 5/16 in. only, other sizes are proportionate

HEXAGONS.

	.455 and .525	.601 to .710
Specification S2	£79	£77
Specification S8	£79	£77
Specification S2 (bright-drawn),	£112	£112
Specification S8 (bright-drawn),	£112	£112

SPELTER.

English f.o.b., Birmingham £57

TIN.

Tin .....£293 10s.

TINPLATES.*

Tinplate .....30s., basis, f.o.t.

TIMBER.

	Official.	Merchants.†
Silver Spruce,	10s. 4d.	18s. 6d., c.f.
Poplar and Cottonwood		15s. to 16s.
Cypress		15s.
English Ash		16s., c.f.
Mahogany,	1s. 6d. to 1s. 10d.	2s. 2d. to 2s. 6d., s.f.
Walnut,	2s. to 2s. 3d.	2s. 3d. to 2s. 6d. s.f.

ZINC.

Zinc Sheets (American).....£100, f.o.b., New York.

SCRAP MATERIALS (LONDON PRICES).

ALUMINIUM.

Description.	Price per ton on sale to refiner, delivery at refinery.
Sheet cuttings and rods containing a minimum of 96 per cent. Al.	£160 0 0
Old rolled, etc., containing a minimum of 96 per cent. Al.	120 0 0
Spinnings, punchings, and thin small scrap; also painted and varnished scrap that needs melting, containing a minimum of 96 per cent. Al.	105 0 0
Lump scrap from aero castings and material of equivalent value, containing 87 to 95 per cent. Al.	100 0 0
Turnings and Swarf, generally containing 87 to 95 per cent. Al.	87 10 0
Scrap, generally containing 80 to 86 per cent. Al.	80 0 0
Swarf and inferior Swarf, generally containing 80—85 per cent. Al.	70 0 0
All Scrap, containing below 80 per cent. Al., not to exceed	65 0 0
All Swarf, containing below 80 per cent. Al., not to exceed	60 0 0
Brass, Heavy Selected	£88
Copper, Clean	100
Copper, Brazery	80
Gun-metal, Scrap	118
Lead, no Draft	26
Zinc, Old	40

*Official Prices.
†Includes Parcel Inspection only.
‡Prices include Delivery in the U.K.

TIMBER TROUBLES.

The timber question is causing considerable interest and not a little uneasiness at the moment. Therefore, the following notes, by one who has "been through the mill," may be of value :—

To begin with, any man who is an expert on timber must go through the same training as any other expert, i.e., he must start from the beginning. The timber expert is no exception, he must literally go through the mill.

Years of experience are needed in order to enable a man to sum up the qualities of a piece of timber in the short time that should be allowed in an aircraft factory. It is not impossible, though improbable, that many men of this type can be found in England. The reason is that no man in the present British army is ever allowed to use his brain for what it has been trained.

For instance, a soldier I knew in one of the London hospitals was sent back from France owing to his having lost all sense of smell, taste, and hearing. On being discharged from hospital this man was given the job of approving of the food about to be served to the men.

[Probably a very wise appointment, if all one hears of soldier-cooks is true. Anyhow, if his judgment of food was bad, it would be to his advantage to be hard of hearing.—Ed.]

It surely must be obvious, even to the Government, that one man who thoroughly knows his business, and is fully trained, is worth any amount of the uninitiated. Again, it would be much less expensive and far more conducive to good work to pay one really able man than ten indifferent ones.

If, on the other hand, there was one trained wood expert in every department, his decision could be made final owing to his knowledge and training.

The question then arises as to where to get these men. Why, Canada, of course! Canada is teeming with such men, Men born and bred in the lumber mills, and their fathers before them.

These men have handled every sort and kind of wood, and have worked on every kind of machine that furnishes the interior of a huge lumber mill. In short, these men have probed deep into the souls of thousands of huge trees, and from the time when they are cut down have followed and worked on them through all their many reincarnations, until they at last bring them to the finished article.

Such men as these do not have to hold a sort of coroner's inquest over a piece of wood, neither do they need to consult others about it, their practised eye tells them immediately if there is a defect or not.

For goodness sake let someone rise and tell the Government of the existence of these men. Force it down their throats into their well-fed stomachs with such zest as to make them vomit these men up and circulate them in the proper quarters.

This herculean feat having been accomplished, again force the Government to throw the bogus timber experts to the Germans. In other words, give them their little suits of khaki and all the appurtenances thereto, and pack them off to the trenches, or the labour battalion or both.

Having got their men from Canada, why not form a training depot for those thought likely to become inspectors of aircraft woodwork, and place the Canadian experts in charge.

If these results were anything like half as good as those obtained from the staff college at Aldershot, we would then have a very formidable resistance to put up against the "barrage" of red tape that is trying its best to lose the war and ruin our great Empire.

Having got this little lot off my chest, I feel better.—J. S.

[Judging by the mess into which aeroplane timber supplies have been allowed to degenerate, chiefly through Government interference with supplies, it really seems as if something should be done by properly experienced timber men to put things right.—Ed.]

THE AUSTIN "ADVOCATE."

The "Advocate," the house organ of the Austin Motor Co., Ltd., contains in its November issue an interesting article on the arrangements which have been made by the firm for the welfare and comfort of its employees.

The most elaborate arrangements have been made for the proper housing accommodation of the workers, and at the Longbridge works, where ordinary lodgings are scarce, the firm owns a complete village of model houses affording accommodation for some 2,000 persons.

A lady lodging inspector has been appointed permanently to inspect and register all available lodgings in the district, and it is her duty to allot suitable lodgings to each girl on her arrival. She also meets travellers at the railway station and conducts them safely to their new homes.

The arrangement of the canteens, recreation and rest rooms, fire brigade and ambulance station, are beyond reproach, and altogether the employees of all grades work and live under the very best possible conditions.

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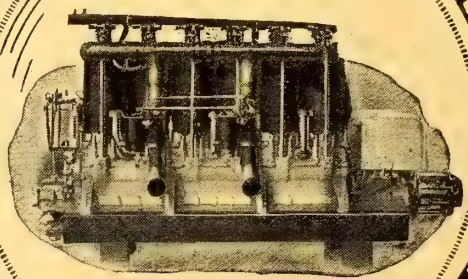
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C.D.C.

AIRCRAFT FINANCE

CURRENT TOPICS.

AIRCRAFT PROMOTIONS.

Various schemes and propositions in connection with aviation continue to be conceived and "draft preliminary" prospectuses for the constitution of new aircraft companies continue to be circulated, all founded on the view that the investing British public are waiting and anxious to put their surplus cash into the pockets of the "wily promoter," via the magic way of aircraft finance.

I have before me a draft prospectus of a proposed company to be formed under the title of "British Aerodromes, Limited," with a capital of £250,000, divided equally into 7 per cent. cumulative participating preference shares and ordinary shares.

The following are some extracts from the prospectus setting out the objects of the company.

> "(A) To increase the training facilities for pupils intending to enter the R.F.C. and the R.N.A.S., and to place the entire organisation at the disposal of the War Office during tht present crisis. The recent hostile aircraft visitations have proved to no small degree the need for training more and more pilots for home defences. . . . The capital now being raised will be strictly devoted to the aerial demands of the present crisis."

The usual accompaniment of extracts from speeches follow, and various names of Government officials are freely quoted.

It is clearly evident that the whole success of this company would depend upon one factor, i.e., whether the Government would, or would not, look favourably upon such a project. The view of one gentleman I have consulted, and who is in a position to know, is, that so far from it receiving any Government encouragement the authorities have already expressed their intention to undertake all future instruction themselves, and not to permit the creation of new civilian flying schools for the training of Service pilots.

The only institutions of the kind at present countenanced by the Government are those which existed prior to the war, and the feeling exists that even some of these schools may be closed to Service work in the near future. Investors would therefore do well to avoid parting with their cash until some official declaration is made upon this important point.

The prospectus goes on to set out under the heading of "Special schools to be acquired" the name of a well-known aviation school in the provinces, and inquiry elicits the information that beyond the school having heard that such a project has been "mooted" nothing further has transpired, and that the name of the school is used without authority.

The prospectus states that the net profit earned by this aviation school for the past year exceeded 11 per cent., but avoids mentioning the capital of this School Aviation Company. An examination of the "file" shows the capitalisation to be £6,000; therefore, the profit earned amounts to the huge sum of £660!!! This is not a very large amount to remunerate the proposed company's capitalisation of £250,000, and it would be somewhat amusing, if it were not so serious a matter, to see that the prospectus makes a big point of the fact that "no promotion profits will be made," when one learns that the Aviation School, with a capital of £6,000, is to be bought by the company at "the fixed purchase price of £30,000."

"Promotions" of this class and character should not be permitted in connection with any industry, and all such attempts to ease the investing public of their money under the plea of patriotism in connection with aviation will continue to be carefully watched and exposed.

WAR FINANCE.

"Save all one possibly can, and invest in National War Bonds" is proclaimed by the National War Savings Committee to be the patriotic duty of every Englishman. No body of British citizens are more keenly alive to their patriotic duty than those connected with the Aeroplane Industry, and I therefore feel that in calling attention in these columns to the efforts of the National War Savings Committee, I am adding my quota to the Nation's need.

To those who have money, or to those who are earning more than their actual requirements necessitate, no sounder advice can be given, as no better investment than National War Bonds can possibly be devised.

The country's needs demand that everyone shall make every sacrifice after the manner of those of our kith and kin who are facing the enemy on sea and land; all we are invited to do is to invest our spare cash in a first-class security in order to enable the Government to prosecute the war with vigour and to crush the enemy. The least we can do in response to the invitation is to invest every penny it is possible for us to accumulate in National War Bonds. This must be our minimum effort, and the time to make it is now.

A "Gilt-edged" Investment.

By investing in National War Bonds we shall be helping to win the war, but it would be rank hypocrisy to pretend that the investment involves any sacrifice. For it is nothing of the kind. It is business pure and simple, and good business, too. The National War Bonds offer a choice of securities. The three classes of Five per cent. Bonds are repayable.

(1) On October 1st, 1922, when the capital will be returned with an addition or premium of £2 for every £100 invested (2s. on every £5 invested):

(2) On October 1st, 1924, when the capital will be returned with an addition or premium at the rate of £3 for every £100 invested (3s. on every £5 invested):

(3) On October 1st, 1927, when the capital will be returned with an addition or premium at the rate of £5 for every £100 invested.

(4) The Four per Cent. Bonds (free of Income Tax) are repayable on October 1st, 1927, when the £100 invested will be returned without any addition or premium.

An important point for investors to remember is that all classes of National War Bonds carry valuable conversion rights into the War Loan, and the right to conversion into any new issues.

The Investors' Choice.

From the foregoing it will be seen that the three classes of Five per cent. National War Bonds not only yield a substantial rate of interest, but that in addition a moderate premium is paid on redemption.

The best class of bond for the ordinary investor is that which has a duration of ten years, and it speaks well for the discrimination of the public that the amount of money put in the ten-year bonds is one and a half times more than the total invested in the other classes of bonds put together. Many people, especially if they are in business, find short-term securities more convenient than those of longer duration, and to these the five and seven year National War Bonds will appeal; but when all is said and done, the ten-year bonds offer greater attractions, and therefore it is not surprising that the demand for these on the part of the general body of investors is rapidly expanding.

For this reason it is expected that there will be a very large increase in the sales of the ten-year bonds, which give a high return combined with absolute security.

The Chancellor of the Exchequer has issued a communication to the Press under cover of a letter from the Director of Publicity of the National War Savings Committee refuting the mischievous and pestilent rumours prevailing in certain quarters, as to what may eventually happen to jeopardise the nation's credit. The Chancellor's letter is quite clear, definite, and to the point, and the assurance he gives to the investors in National War Bonds should satisfy the most captious critic. The final paragraph of his letter is worthy of close attention:—

> "Whatever be the financial policy of the British Government after the war, I am certain of this, that any discrimination there may be will not be in favour of those who have withheld their money from the State at the time when its needs were greatest."

This should give the man who has not so far subscribed to the War Loan serious food for thought.

EXCESS PROFITS DUTY.

Considerable doubt is experienced by every firm having surplus capital, in relation to Excess Profits Duty, so that the publication by the Commissioners of the Inland Revenue of a note dealing with the question is extremely welcome. The point is of great interest to the Aeroplane Industry, and, though it leaves the principal point to be judged "according to the facts of individual cases," the document forms some basis of computation. The following is the textual copy of the recent pronouncement:—

EXCESS PROFITS DUTY.

"The Commissioners of Inland Revenue understand that some misapprehension continues to exist as to the effect of an investment of funds in National War Bonds on the liability of a business to Excess Profits Duty.

"Capital which is, or will shortly be, required for the purposes of a business will for Excess Profits Duty be treated as capital employed in the business, whether it is kept at the bank or invested in Treasury Bills, or whether, on the other hand, it is invested in War Loan, Exchequer Bonds, or National War Bonds. It is erroneous to suppose that the holding of such capital in a bank account, as compared with an investment thereof in War Bonds, involves a distinction in its treatment for Excess Profit Duty purposes.

"The question whether a particular block of capital, either lying at a bank or used in the manner above indicated, falls to be included in, or excluded from, the capital employed in a business as ascertained under the Excess Profits Duty Acts, is a question to be decided according to the facts of individual cases, but the proprietor of a business does not prejudice his claim in this respect by investing the capital in War Bonds. His claim will be judged by the same considerations as are applied to claims as respects capital allowed to remain at the bank"

NEW COMPANIES REGISTERED.

The files of the following new companies registered with the nominal capitals of £5,000 and upwards are now available for inspection at Somerset House :—

J. JACKSON, LTD., Bramley, near Guildford, Surrey. Registered November 28th, to carry on business as ironfounders, mechanical engineers, motor engineers, manufacturers of aeroplanes and other aircraft, etc. Nominal capital, £10,000, in 10,000 £1 shares of which 5,000 are preference shares and 5,000 are ordinary shares.

ALPHAERO ENGINES, LTD., 57, Gracechurch Street, E.C. Registered November 29th, to purchase, apply for, or otherwise acquire in England or elsewhere, letters patent, brevets d'invention, licences, concessions, etc. Nominal capital, £20,500, in 20,500 £1 shares.

ASHFORD AIRCRAFT WORKS, LTD., Cree House, Gracechurch Lane, E.C.3. Registered November 29th. The nature of the business is indicated by the title. Nominal capital, £10,000, in 9,750 £1 preference shares and 5,000 1s ordinary shares.

INGATE ENGINEERING COMPANY, LTD. Registered December 3rd, to carry on all or any of the businesses of manufacturers, inventors, designers, repairers, patentees, warehousemen, and dealers of and in internal combustion engines, aeroplanes, etc. Nominal capital, £2,000, in £1 shares.

AERO-MOTOR ENGINEERING COMPANY, LTD. Registered December 4th. £10,000, in £1 shares.

MORTGAGES AND CHARGES REGISTERED.

AIRCRAFT MANUFACTURING COMPANY, LTD., London, S.W. Registered November 21st, £12,500 mortgage, to C. Death; charge on property at Kingsbury; also registered November 21st, £5,000 charge under Land Transfer Acts, to E. F. Knapp-Fisher; charged on 27, Buckingham Gate, S.W.

DISSOLUTION OF PARTNERSHIP.

NOTE.—When two dates are given in the following announcements, the first is the date of the dissolution. The date in parentheses is that of the official advertisement.

LONDON AND PROVINCIAL AVIATION COMPANY (Michael Geoffrey Smiles, Wm. Thos. Warren, and Walter Dorling Smiles), Stag Lane Aerodrome, Edgware, makers of biplanes and monoplanes and flying machines generally, and the instruction of pupils as aviators. November 1st. Debts by M. H. Smiles and W. T. Warren, who continue. (November 27th.)

DIVIDEND NOTICES.

ERRATUM.

BROWN BROTHERS LTD.—In the notice published in these columns last week announcing that the Directors had declared a dividend on the Ordinary shares at the rate of 2½ per cent. (free of income-tax) the Company draw attention to the fact that this is an "INTERIM" dividend, and that the omission may cause misunderstanding.

ANSWERS TO CORRESPONDENTS.

Inquiries on any subject affecting or relating to Investments, Stocks, Shares and Securities of Aircraft and kindred companies will be answered in these columns (free of charge).

"DOLORES."—The concern you mention is a private company, and is therefore not compelled to file or publish any balance-sheet. The directors also have the right, in accordance with the Memorandum and Articles of Association of the company, without giving any reason, to refuse to transfer shares, the company being what is generally known as a "close" corporation.

The law protects this course, firstly, for the reason that a private company is severely restricted as to the number of its shareholders, and secondly, because it enables the company to prevent opponents in business, or anyone susceptible of becoming a competitor for their particular business from becoming a shareholder, and thus acquiring the right to information which might be detrimental to the business concerned.

Consequently, before paying for these shares, you would do well to ascertain that the directors will transfer to you. This is a particular point that only affects private companies.

"BUSINESS."—You are only permitted, as an ordinary shareholder, to criticise the directors' operations once a year, at the annual general meeting of shareholders, and you would be perfectly in order to raise the point when the chairman asks the shareholders to adopt the accounts and directors' report.

The directors, however, are not compelled to give any information beyond the report, and may refuse to answer any question solely on the ground that they do not consider it advisable to do so.

If the shareholders, however, are not satisfied, they may refuse to pass the accounts and reject the report. Then it is open for someone to move a special resolution to adjourn the meeting, and to appoint a special committee of inspection to report to the shareholders at the adjourned meeting.

If this is done in proper order, and the special resolution carried by a three-quarters majority, the directors cannot resist, and subsequent proceedings would, of course, depend upon the report of the committee of inspection. G. A.

ON COVENTRY.

The following letter has been received :—

Sir,—With reference to your article in this week's AEROPLANE "On Coventry," the phrase "Sent to Coventry," is supposed to originate from the fact that, a long time ago, the citizens of Coventry had so great a dislike to soldiers, that a woman seen speaking to one was instantly tabooed.

No intercourse was ever allowed between the garrison and the town. Hence, when a soldier was sent to Coventry, he was practically cut off from all social intercourse.

From the recent disgraceful state of affairs in Coventry, it would seem that the people still had a "great dislike to soldiers," and are showing their spite by way of the most modern and up-to-date ideas. (Signed) A. A. P.

WHITEHEAD ALTERATIONS.

One gathers that very considerable alterations have taken place in the management of Whitehead Aircraft, Ltd, in the course of the last few weeks. The time is not yet ripe to discuss the changes fully, but it may be taken that the threatened flotation will not be inflicted on the public—at any rate, not under the conditions disclosed some weeks ago in this paper.

Meantime, very great improvements have taken place in the workshops. Organisation has been improved, supplies have been adequately handled, and the general business arrangements have been put on a firmer footing. The result is that an immediate and quite remarkable increase in output has taken place.

CURRENT SHARE QUOTATIONS.

Aircraft Mnfg. Co	7% cum. pref. £1 ...	24/-	25/-
	7% cum. & ptg. "B" pref., (fully paid)	22/-	23/-
Armstrong Sir W. (1905) Ltd.	4% cum. pref. £5...	3¼	3⅝
	5% 2nd. pref. £1 ...	17/-	18/-
	£1 ordinary	42/-	43/-
Austin Motor Co., Ltd.	7% cum. pref. £1...	18/-	19/-
	£1 ordinary	25/-	26/-
Birmingham Small Arms Co., Ltd.	£1 ordinary	50/-	51/-
	5% cum. "A" pref.	4⅛	4⅜
	6% cum "B" pref.	19/-	20/-
Boulton & Paul, Ltd., 5% cum pref. £1		¾	⅞
Brown Bros., Ltd., 6% cum. pref. £5...		4⅛	4⅝
Darracq (A) & Co., (1905) Ltd.	£1 ordinary ...	33/-	34/- x
	7% cum. pref. £1 ..	22/-	23/- x
Electric Construction Co., Ltd.	7% cum. pref. £1 ...	20/-	21/- x
	£1 ordinary	24/-	25/-
Fellows Magneto Co., 8% cum. partip. pref.		16/-	17/-
General Electric Co., Ltd.	6% cum. pref. £10 ...	10¼	10¾
	£10 ordinary	19¾	20
Gwynnes, Ltd., 5% cum. pref.		91/-	92/-
Ordinary		9/-	9/6
Greenwood & Batley, Ltd., £10 ordinary		9¼	10
Humber, Ltd., 6% cum. pref. £1		15 6	16 6 x
£1 ordinary		19/-	20/-
Napier (D) & Son, Ltd., 7½% cum. pf. £1		18/-	19/-
Peter Hooker, Ltd., £1 7% cum. partic. 1st pref.		19 6	20/-
Rolls Royce, Ltd., £1 ordinary		62/-	63/-
Rudge Whitworth, Ltd. £1 ordinary ...		50/-	51/-
Ruston, Proctor & Co., Ltd.	£1 ordinary	28/-	29/-
	5% cum. pref. £1 ...	17/-	17/6
Sunbeam Motor Car Co., Ltd., £1 ord...		79/-	80/- x
Straker Squire, Ltd. (1913), £1 ordinary		22/-	23/-
S. Smith & Son, Ltd. (Motor Accessories) £1 ordinary		28/-	29/-
Triplex Safety Glass, £1 ordinary... ...		23/6	24/6
Vickers, Ltd., 5% pref. stock...		78	82
5% pref. shares. £1 ...		17/6	18/6
£1 ordinary		42/-	43/-
Wm. Beardmore & Co., Ltd., 6% c. pf. £1		18/-	19/-

GENERAL INFORMATION.

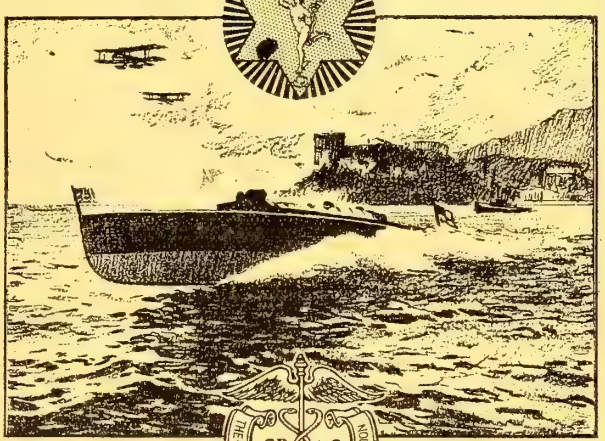
Armstrong, Whitworth (1916).
Austin Motor 1916).
B'ham. Small Arms (1915-16).
Rolls Royce.
Rudge Whitworth.
Straker-Squire (1915).
Sunbeam Motor.
Thorneycroft (J. I.) & Co.
Vickers (1915 and 1916).

Owing to the difficulty of estimating liabilities under Finance and Munitions Acts, the accounts will not be ready until a later date.

x—ex dividend

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One outstanding feature of the Whitehead establishment has been the loyalty and enthusiasm of the workpeople. From the departmental managers to the shop-sweepers everybody has always done his or her best to get on with the war. And, be it said, in particular, the shop-stewards have been, and are now more than ever, doing their level best to boost up output, and to encourage the hands, instead of stirring up trouble and delaying output, as has been the case elsewhere.

The result of the changes mentioned has been to fire still more the enthusiasm of the workers, and it is hoped that before long they will receive that official commendation from the highest quarters which they have done so much to deserve.—C. G. G.

A NOTABLE MOVE.

The "London Gazette" of Dec. 10th notifies that Mr. H. V. Roe has become a Lieutenant on the General List, R.F.C. Mr. Roe, who fought in South Africa and went through the siege of Ladysmith as an officer of the Manchester Regt., offered his services to the Army at the beginning of this war, but was told to go home and make aeroplanes. This injunction he obeyed with remarkable effects, his previous business success, which incidentally permitted him to bear the financial burden of the early Avro experiments, pointing the way to the building up of the little Avro business into a vast manufacturing concern. To-day the output of Avro aeroplanes is enormous, and the machines are doing work of rapidly increasing value to the Services.

As the works have for some time been established on an organised commercial basis, Mr. H. V. Roe believed that they could go on running in the same way without him, at any rate for the duration of the war, and he consequently applied again to be allowed the honour of wearing the King's uniform. One imagines that Mr. Roe, being a wise man, still retains his interest in the Avro firm, and one hopes that he has made the fact abundantly clear to the highest legal authorities of the Crown. We have already had one example of the legal method of rewarding an officer who had conferred on a flying service a machine of outstanding merit, and one would hate to think of one of the Roe brothers being shot at dawn for retaining an interest in the business which he created and which has done as much as any business of its kind to produce the present highly efficient state of the Flying Services.

In any event, Mr. H. V. Roe will carry with him in his renewed military life the good wishes of the whole Aircraft Industry.—C. G. G.

A BRITISH PIONEER.

One of the most peculiar things about British aviation before the war was that, despite the number of first-class fliers in this country, hardly any British aviators had any reputation outside the British Isles. At the first Gordon-Bennett Race, at Reims in 1909, the only British representative was Mr. G. B. Cockburn. Later on Mr. Claude Grahame-White and Mr. T. O. M. Sopwith won great reputations in America, but on the Continent of Europe little was known of our pilots. Mr. Oscar Morison (now Lt. R.N.V.R.) and Mr. James Valentine (who died gallantly in Russia as a major with a D.S.O.) were the only British starters in the famous European Circuit of 1911, and both were esteemed by French critics as being quite in the front rank of the world's aviators. Just after that race Mr. Gordon Bell (late Capt. R.F.C.) went to France as an experimental pilot for M. Robert Esnault-Pelterie, and won a reputation as a first-class pilot. After him the late Mr. Gustav Hamel achieved a reputation in France, and there you have a list of practically all the British pilots with extra-British reputations.

Of them all probably Capt. Bell was the most widely and at the same time intimately known among Continental aviators. He had learned to fly in 1910 on the old Hanriot, nicknamed the "Henrietta," at Brooklands, and had been highly successful as an instructor on the same machine, being a trained engineer and not merely a clever flier. When he went to France and began flying the high-speed R.E.P. monoplanes, then probably the best built and designed machines in the world, but spoilt by their heavy engines, he was quickly recognised as being no ordinary pilot. The crack R.E.P. pilots, Gibert, Amerigo, and Molla, accepted him as a man and brother, and entered into friendly competition with him as to who should be recognised as the best man. And, be it said, there was nothing much to chose between the British pilot and the best of them.

So highly did "Monsieur Robert," as he was always called, think of Mr. Gordon Bell that he sent him on a special mission to Turkey to demonstrate the R.E.P. machines to the Turkish Government. While in Constantinople Mr. Bell achieved the interesting distinction of being the first aviator to fly from Europe to Asia, the journey being across the Marmora and back.

Later, on his return to England, Mr. Bell increased his skill and experience, and made a hobby of flying every possible and impossible make of aeroplane, with the result that when war broke out he had flown 63 different types, and could probably have claimed to hold the world's record for variety of experience.



Captain C. Gordon Bell.

He was just as much at home on big machines as on small ones, and on seaplanes or land machines. Among his experiences is the unique one of being the only civilian pilot who flew "Naval Aeroplane No. 1," the first Short box-kite bought by the Admiralty, and also the only civilian to fly the Navy's first real seaplane, likewise a Short.

As an officer of the R.F.C. Reserve he went on active service at the outbreak of war, and was in France in 1914, 1915, and 1916, flying practically every type of machine then in use. Afterwards, owing to bad health, he was put on to training work and experimental flying, with temporary rank as major. Here he gained further experience of the highest speed modern scouts.

Some months ago he was invalided out of the Army, retaining his rank as captain, and has since been carrying out for various designers much experimental work of great interest. Within the past few days, for instance, he has flown such widely different machines as the latest Handley Pages—which are about the biggest aeroplanes in the world—and the little Vickers scout—which is about the smallest and fastest. Perhaps the most remarkable thing about Capt. Bell is that after some-seven ytars of constant flying he should still retain all his old skill and versatility as well as his nerve. One gathers that his flying is somewhat quieter than it was when he used to perform his most daring tricks in the air, but that, by way of compensation, his judgment on new types, always remarkably good, has matured with experience. In these war days, when one loses sight of people so easily, his many friends, both in this country and abroad, will doubtless be interested to learn from these notes that one of the pioneers of British aviation is still doing valuable pioneer work with new experimental types.

AIR BOARD NOTICE.

The Aeroplane is requested by the Controller of Aeronautical Supplies to publish the following paragraph:—

In view of the shortage of timber, all Aeroplane Contractors, who have on their premises reels on which Flexible Steel Wire Rope has been supplied, are requested to return the same to the wire rope manufacturers.

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THE WORLD'S BEST PLUG

(*Continued from page* 1730.)

was again sent to the front on Sept. 29th last, and was killed on Nov. 28th. He was the only son of the late George W. Strettell (Indian Forests), and of Mrs. Strettell, of Roanhill, Kincardine, Fife. Mr. Strettell was 24 years of age.

WHITE—Lt. John Gardner White, Scottish Rifles (Cameronians), attached R.F.C., who was killed on Aug. 26th, whilst "on a special mission over the German lines," was the second son of the Rev. John White and Margaret White, The Barony, Glasgow. He was 20 years of age.

* * *

DEAKIN.—Kate, wife of Norman Deakin, Yeo., attd. R.F.C., and eldest daughter of Rear-Admiral Sir Sydney and Lady Eardley-Wilmot, died on Dec. 8th at Tonacombe, Bembridge, Isle of Wight.

* * *

Sec. Lt. Maurice Nicholson, R.F.C., was reported missing on Aug. 18th. If any officer or man can give any information, or if relatives of prisoners of war in Germany would ask for news, the same would be gratefully received by Mr. Nicholson, 16, Newbould Lane, Broomhill, Sheffield.

Engagements.

SCHERK—HARRIS.—An engagement is announced, between Lt. Reginald H. Scherk, Reserve Canadians and R.F.C., elder son of Dr. and Mrs. F. H. Scherk, of Balmy Beach, Toronto, and Molly, third daughter of the late Mr. T. Harris and Mrs. Harris, of Ashford, Kent.

SMITH—FULLER.—A marriage has been arranged, and will shortly take place, between Capt. Charles Molyneux Smith, M.C., R.F.C., eldest son of Mr. and Mrs. Arthur Smith, of Glenavon, Oaklands Road, Bedford, and Barbara Fuller, widow of Capt. W. B. Fuller, Queen's R., and daughter of Major and Mrs. S. A. Pixley, of Maybury Knowle, Woking.

Marriages.

ANTHONY—LLOYD.—On Nov. 28th, at Kirby-le-Soken, Essex, Capt. Wynnard Anthony, R.F.C., only child of Mr. and Mrs. Alfred Anthony, of Colchester, was married to Rosamund Angharad Kathleen, fourth daughter of Mr. and Mrs. Llewelyn Lloyd, of Kirby-le-Soken.

GREG—WATKINS.—On Dec. 6th, at All Souls' Church, Portland Place, Capt. Osbert M. Greg, Royal Warwicks, attd. R.F.C., elder son of Mr. and Mrs. Herbert Greg, of Macclesfield, was married to Eileen, elder daughter of Mr. and Mrs. H. H. Watkins, of Mumbles, Glamorgan.

LUGET—STIMPSON.—On Dec. 6th, at the Chapel Royal, Savoy, Lt. F. Britton Luget, R.F.C., son of J. B. Luget, of Balham, was married to Dorothy, only daughter of the late William Stimpson and Mrs. Stimpson, of Southsea, by the Rev. Clive Luget, cousin of the bridegroom.

MACLEAN—MORRIS.—The marriage arranged between Capt. Lachlan Loudoun MacLean, Indian Infantry and R.F.C., and Phyllis Aileen Morris, eldest daughter of the late Lt.-Col. Godfrey Morris, 8th Gurkhas, and Mrs. Morris, of 98, Philbeach Gardens, will take place at St. Peter's, Cranley Gardens, on Saturday Dec. 15th, at 2.30.

MENDL—THOMAS.—On Dec. 4th, at the Registry Office, Paddington, and afterwards at St. James's, Piccadilly, Lt. Charles Tom Sigismund Mendl, Devon R. and R.F.C., elder son of Mr. and Mrs. S. F. Mendl, of 17, Hyde Park Street, was married to Beryl Althea (Betty), younger daughter of the late R. C. Thomas, of The Court, Merthyr Tydfil, and of Mrs. J. Baker White, The Cottage, Shaldon, Devon.

Births.

EWEN.—At Edinburgh, on Dec. 2nd, the wife of Capt. W. H. Ewen, R.F.C., of a son.

HIBBERT.—On Dec. 6th, at "Douglas," Madeira Road, West Byfleet, to Margaret (née Judkins), wife of Lt. J. E. Hibbert, M.C., S. Lancs R., attd. R.F.C.—a son.

HOWELL.—On Dec. 1st, at Hobson's Choice, Cambridge, to the wife of Sec. Lt. Charles Hurd Howell, R.F.C.—a daughter.

KELLY.—On Monday, Dec. 3rd, 1917, at Madingley, Eastham, Chester, the wife of Maj. J. Upton Kelly, D.S.O., Wiltshire Regt. and R.F.C., of a son.

WRIGHT.—On Dec. 6th, at Hermosa Nursing Home, Teignmouth, the wife of Major A. Claud Wright, R.F.C.—a son.

An Army Council instruction states that officer cadets training with the R.F.C. cadet wing will wear the cap badge of the corps. All cadets will wear on the shoulder straps of jackets and greatcoats the numeral of the cadet unit with which they are training.

* * *

Mr. G. Ward Price, writing from British Headquarters in Italy on Dec. 3rd, says :—

The first shots exchanged between the British Expeditionary Force and the Germans on the Italian front have brought success to our arms. It was an encounter in the air, and the Royal Flying Corps opened this new campaign with an achievement of good augury, for the very first day that our aviators crossed the enemy lines they shot a German machine to pieces, and sent it crashing to earth on the banks of the Piave.

Four of our machines crossed over to the German side of the river for a flight along the northern sector of the plain. The little squadron had not gone five miles before they were attacked by five German Albatros scouts. One of these enemy machines was immediately driven down in a vertical dive, but at 5,000 ft. it flattened out again.

Meanwhile the fight went on with the rest. After 20 minutes of continual manœuvring and occasional bursts of fire another of the enemy was driven down. His British antagonist followed him in his dive, and as the German flattened out again the English pilot got a burst of 80 rounds into him at close range. That ended the fight. The right wing of the German machine collapsed and fell back along the fuselage. At once the Albatros turned over and fell, the rest of the right wing breaking loose as it crashed to earth.

By this time the enemy had received reinforcements, but for all that another of his aeroplanes was driven down out of control below 5,000 ft. Then the four British machines returned, having encountered in this first outing of theirs 12 German adversaries, of which they had smashed up one and seriously damaged two.

Flying conditions here will be very different for our aviators from those to which they were accustomed in France. For one thing, they will probably have to carry out reconnaissance flights above high mountains. Good landing places are very scarce even in the plain. However hard conditions may be here, those pilots and observers who have had experience of Flanders believe that there is no chance that their work will prove more arduous than it was in France.

FRANCE.

Official Communiqués.

Dec. 4th.—During Sunday two German aeroplanes were brought down by our pilots. Three other enemy machines fell into their own lines.

Dec. 5th.—Enemy aeroplanes bombed last night the region north of Nancy. Three persons were wounded.

During the day of Dec. 3rd two German aeroplanes were brought down by our pilots. Six other machines were forced to land in their own lines.

Last night Dunkirk was bombarded by enemy aeroplanes. Two persons among the civil population were killed.

Dec. 6th.—During the day of the 5th our aviation service was very active. Three German aeroplanes were brought down and eight other machines badly hit in fighting with our pilots in their own lines.

Our bombarding aeroplanes carried out different operations. Nine thousand kilos (about nine tons) of projectiles were dropped, especially on the railway stations and depots of Lichtervelde and Cortemarck, on the cantonments and bivouacs in the region of Laon, and on the depots of Roussach, etc.

Some German aeroplanes dropped bombs during the night of the 6th in the region of Dunkirk. There were several casualties. Calais was also bombarded during the same night. No casualties were reported.

Dec. 7th.—During the night of Dec. 5th-6th our aviators bombarded the railway stations at Freiburg and Thionville, and various enemy depôts and cantonments behind the front.

Dec. 8th.—During the bombardment of Calais by German aeroplanes during the night of Dec. 5th-6th seven persons were killed and about 20 injured.

* * *

Following the British example, the French on Dec. 8th opened a loan office, not in a tank, but in a car of the Zeppelin L29, captured at Bourbonne-les-Bains.

There was a large crowd of people anxious to have their scrip stamped with the Zeppelin stamp. They passed through an avenue of captured guns to the Zeppelin, in front of which is installed Capt. Guynemer's aeroplane.

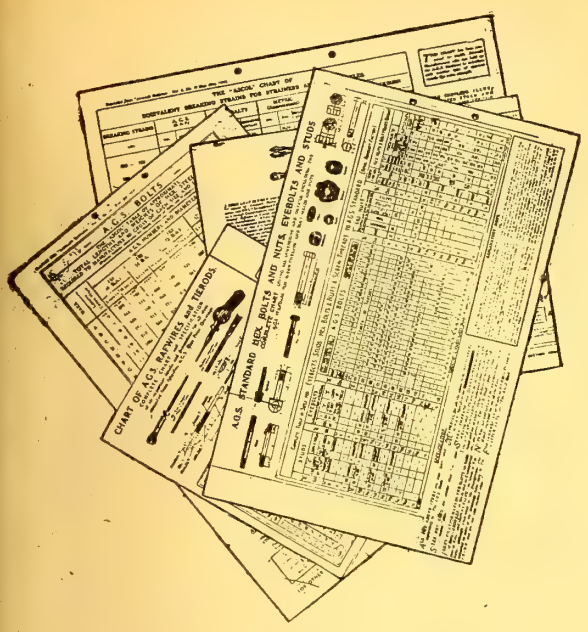
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According to the "Matin," Paris, Dec. 5th, a dirigible balloon has emulated the exploit of the aviator Garros, by crossing the Mediterranean. The airship started from Paris, reached Aubagne, near Marseilles, and arrived at Algiers without incident, after a journey lasting eleven hours.

* * *

A message from the Paris correspondent of the "Morning Post," dated Dec. 5th, states that Captain Louis de Goys, one of the most famous French aviators, has reached France after two and a half years' captivity, having at last succeeded in escaping. He commanded 18 machines which bombarded the explosive factory of the Badische Anilin und Soda Fabrik on May 27th, 1915. The expedition was a complete success, Capt. de Goys' machine alone being brought down through motor trouble, and he and his pilot, Bunau-Varilla, being captured.

In a short statement made to the Press, Capt. de Goys ex-



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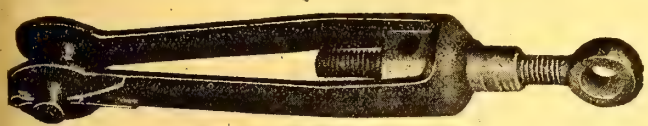
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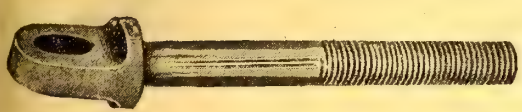
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plained that he had time to set fire to their machine. During his captivity he explains that he was imprisoned in various fortresses. On ten separate occasions he made attempts to escape, without success. In one case he actually got to within a few hundred yards of the Swiss frontier. However, on the 18th of last month, in the company of a young officer, Lt. Diamant Berger, he escaped from Hirschberg Castle, in Bavaria. The actual escape was not easy. A score of times the two officers had to change their disguises, and a hundred times they had to put amateur and professional police off their track. After many adventures they reached the Dutch frontier.

Capt. de Goys was at one time in charge of important works in Turkey.

GERMANY.

Official Communiqués.

Dec. 6th.—Yesterday 18 enemy aeroplanes were brought down in aerial fighting and by gunfire from the ground.

Our aviators bombed the harbour establishments of Calais, as well as London, Sheerness, Gravesend, Chatham, Dover, and Margate. Large and numerous fires showed the effectiveness of these attacks.

Dec. 8th.—Lt. Müller has obtained his 37th aerial victory.

Front of Duke Albrecht.—Lt. Müller obtained his 36th victory in the air.

* * *

The Griesheim factory, near Frankfort, which was recently destroyed by an explosion, manufactured among other things hydrogen for Zeppelins. The daily newspaper reports state that the factory possessed by way of reserve three gasometers with a total capacity of over 300,000 cubic feet. This is obviously absurd. Any self-respecting Zeppelin requires about 2,000,000 cubic feet of gas. The account runs on to say:—"So important was it in this respect, that a Zeppelin shed, usually containing two or three airships, was erected in close proximity to the works. For the kite balloons at the front the gas was supplied in steel tubes in the liquefied state."

* * *

A telegram from Ludwigshafen states that two Allied aviators appeared over Zweibrücken on Dec. 5th and dropped eight bombs. Four persons were severely wounded and a number of houses damaged.

* * *

On Dec. 6th an aerial fight, in which several aeroplanes were engaged, took place between Müttenz and the Rhine, near Basel. Two bombs fell in the vicinity of a school at Müttenz. The windows of the gymnasium were broken, the garden fence uprooted, and the school building and some neighbouring houses were damaged.

AUSTRIA.

Official Communiqué.

Dec. 8th.—Our aviators yesterday fought numerous aerial battles and shot down six Italian aeroplanes. The "deputy" officer Arrighi gained his 21st aerial victory.

ITALY.

Official Communiqués.

Dec. 4th.—Enemy troops and encampments were also bombarded by our aircraft in Galmarara Valley (north of Asiago town) and neighbouring zones.

Two enemy captive balloons were brought down

Dec. 7th.—On the afternoon of the 5th two enemy aeroplanes, one of them in an aerial combat, were brought down by our French Allies.

Dec. 8th.—Between Asiago and the head of the Frenzela Valley movements and assembling of enemy troops, which always kept out of rifle range, were noted, and served as objectives for big bombardment actions carried out by our and our Allies' air squadrons. Altogether 150 machines dropped bombs on the enemy's lines, causing damage, losses, and explosions of ammunition dumps. The valiant aviators, then flying low, attacked the enemy troops with machine-gun fire.

Last night our airships in the neighbourhood of Quero [right bank of the Piave, just north of the Italian line] and Motta di Livenza [on the plain, 12 miles east of the Piave] bombarded with several tons of bombs enemy bivouacs and motor-lorry columns in movement. In air duels three enemy machines were brought down during the day. Maj. Baracca gained his 30th victory.

Dec. 9th.—Our Caproni machines effectively bombarded the enemy's lines of communication on the Asiago Plateau, afterwards firing with machine-guns on the troops leaving the places bombed. During last night the airships repeated their daring raids, dropping more than four tons of bombs on enemy encampments near Quero, Motta di Livenza, and Portogruaro [18 miles east of the Piave]. Two enemy aeroplanes were brought down and a captive balloon on fire fell in the neighbourhood of Grisolera [near the mouth of the Piave].

Dec. 10th.—An enemy aeroplane was brought down by a French aviator.

Official Admiralty Communiqués.

Rome, Nov. 22nd (Night).

Our seaplanes are continuously carrying out scouting work and

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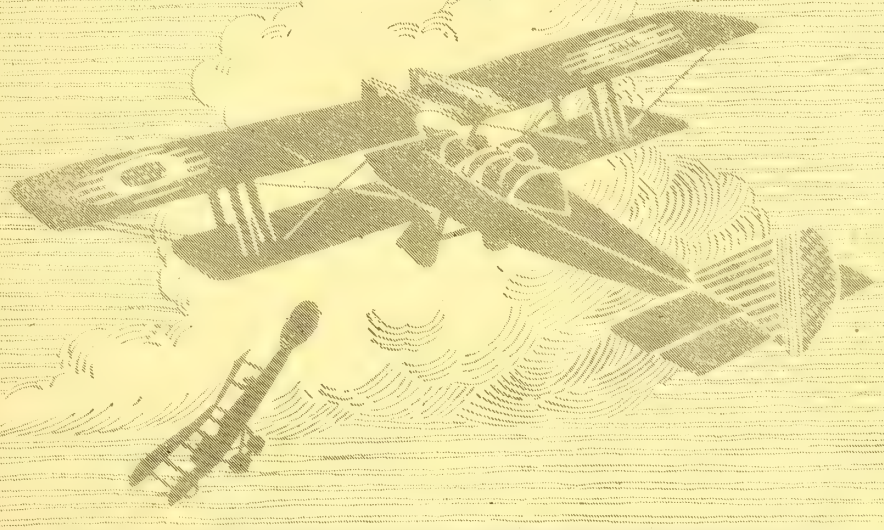
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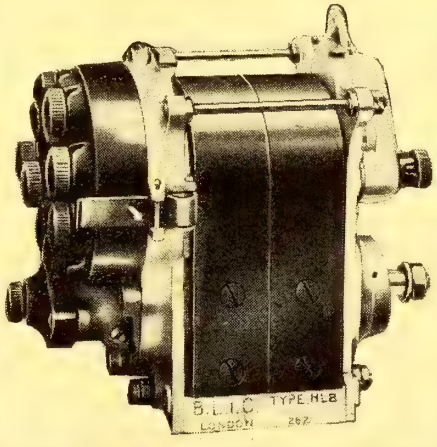
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bombarding ships, troops, and the enemy's works, as well as artillery spotting and fights in the air of great violence.

On 16th, together with French chasers, they fell upon a squadron of enemy ships and the numerous aircraft escorting it. One of the torpedo chasers was hit by fire bombs dropped from one of our seaplanes, and one of enemy aeroplanes was brought down with a broken wing by two French machines, Serjts. Levi and Cerillon being the pilots

On 18th, two naval seaplanes, piloted by Sub-Lt. Mortara and "Chief Boatswain" Zanetta, with the aid of a French machine, set out after three enemy aeroplanes reconnoitring on the Sile front and brought down K211, the occupants being brought to Venice as prisoners.

On 19th, another seaplane, while taking photographs, was set upon by two hostile aeroplanes, and, in a violent combat, brought one of them down.

On the same day, a torpedo-chaser, near Tagliamento Point, was attacked by a seaplane of ours and hit by a bomb.

On 20th, another enemy was forced to come down quickly beyond the Piave as the result of an aerial duel.

On 22nd, one of our seaplanes, piloted by "Sub-Boatswain" Panichi, attacked at 3,600 metres over Grado by three enemy waterplanes after a lively fight brought one down crashing onto the rocks close to the town.—T. S. H.

* * *

Rome, Nov. 24th (Night).

The war bulletins have day by day made mention of operations crowned by success which our bomber squadrons and airships have carried through in the face of every kind of difficulty created by the German onslaught. No less were the difficulties which the chasing squadrons have had to overcome—either due to the great increase in the enemy's air forces owing to the arrival on this front of so many new fast machines and German pilots, or to the unfavourable working conditions in which the flying men found themselves, because of the retirement of the Army. None the less, it was with superb courage and magnificent self-sacrifice that our aviators faced, and are facing, the enemy.

Not less than 51 hostile aeroplanes, many of which were German, were brought down between Oct. 22nd and Nov. 23rd. Nineteen fell, in most cases on fire, in our lines; the fall of the others in the enemy's country, and often close to our lines, was ascertained positively. Over and above this number other of the enemy's machines were, it is sure, brought down and forced to land in the course of the very many air duels in the first days of the offensive. But of these as the strict means of seeing them and checking them which had been pre-arranged was not possible owing to the retirement no account has been made.

In those duels, the result of which could be certified, Major Baracca gained his 28th victory, Lt.-Col. Piccio his 17th, Capt. Ruffo di Calabria his 16th, Lt. Ranza his 9th, Lt. Parvis his 7th, and Serjt. Poli his 6th.

Our losses were considerably lighter than the enemy's; 18 machines failed to return, three fell in our lines after duels, and three observers were brought home by their pilots dead.

Serjt. Guarnieri brought down a large seaplane well provided with bombs on the sea near Ravenna on 21st. The machine was afterwards towed into Port Corsini, the aviators having disappeared, while Guarnieri, who was flying a single-seater had gone for help.—T. S. H.

HOLLAND.

Two bombs were dropped during the night of Dec. 5th on the outskirts of Sas van Gent (province of Zeeland) by an aeroplane which came from a northerly direction. The only damage was to some telephone wires.

* * *

A message from Amsterdam on Dec. 9th states that a Dutch lugger reported having passed the wreck of a Zeppelin [Probably a kite-balloon.—Ed.] in the free zone of the North Sea.

There were no signs of any living persons.

SWITZERLAND.

On Dec. 4th a new German aeroplane, flying from Strassburg to Lorraine, lost its way, and, having been fired on, alighted in Switzerland, near the frontier. The aviators, two lieutenants of reserve, were arrested, and taken to Basel.

* * *

At half-past two this morning, near Meuziken, Canton of Aargau, an aviator dropped four or five bombs, which fell in a field, making a hole about 10 ft. deep. The aviator, whose nationality is unknown, afterwards disappeared.

PORTUGAL.

During the recent revolution in Portugal an aeroplane, piloted by Flt. Comdr. Martins Lima, with Lt. Caseiro as observer, whilst flying over the fields on Dec. 8th, where the revolutionaries were concentrating, was brought down by their fire. Flt. Comdr. Martins Lima was killed.

TURKEY.

Official Communiqué.

Dec. 5th.—Our aeroplanes and seaplanes have dropped bombs on Imbros.

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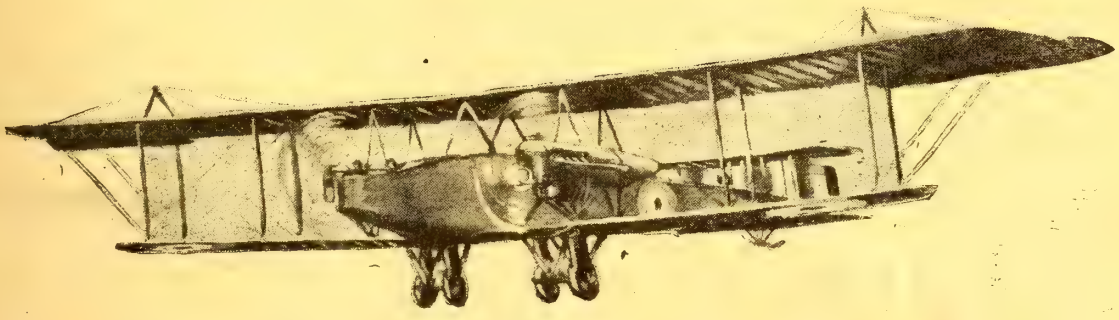
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SE5, De H6.

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LONDON TO CONSTANTINOPLE
ON THE
HANDLEY PAGE
BIPLANE



THE SECRETARY OF THE ADMIRALTY ANNOUNCES:

DURING JULY A SUCCESSFUL AIR ATTACK WAS CARRIED OUT ON OBJECTIVES IN THE VICINITY OF CONSTANTINOPLE. THIS WAS ACCOMPLISHED BY A LARGE BRITISH BOMBING AEROPLANE OF THE HANDLEY-PAGE TYPE, WHICH FLEW FROM ENGLAND, WHERE SHE WAS CONSTRUCTED, TO ONE OF OUR BASES IN THE MEDITERRANEAN.

THE TOTAL DISTANCE FLOWN WAS NEARLY 2,000 MILES, THE MACHINE BEING ACTUALLY IN THE AIR FOR JUST OVER 31 HOURS, WHICH IS BELIEVED TO BE EASILY A WORLD'S RECORD FOR A CROSS-COUNTRY JOURNEY, AND ALSO FOR THE WEIGHT CARRIED FOR THE DISTANCE, THE MACHINE BEING SELF-CONTAINED AS REGARDS ENGINE AND AEROPLANE SPARES.

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THE INVASIONS OF ENGLAND

During the early morning of Dec. 6th, an air raid was made by 25 enemy aeroplanes upon London and the South-eastern Counties. The most remarkable feature of the raid was its lateness in the night (or earliness in the morning), which, of course, was governed to a considerable extent by the moon.

As the result of anti-aircraft measures, one Gotha made a forced landing, and two officers and an N.C.O. surrendered, slightly injured, to a clergyman-special-constable.

Another machine alighted near an Essex aerodrome, and an officer and two men surrendered. All the bombs were still in place, and soon after the descent the machine caught fire, presumably the result of the action of the crew.

* * *

It is highly satisfactory to note that though some 25 aeroplanes crossed the coast only four or five penetrated into the London area proper, and the London defence forces may justifiably feel gratified at the success of their efforts. When one considers how many men in an infantry attack succeed in dodging an artillery barrage of much greater intensity in broad daylight, and succeed in reaching the enemy's trenches, in spite of concentrated machine-gun fire, one realises better the success achieved in preventing so high a proportion of the enemy's aeroplanes from reaching London, despite the fact that the guns were shooting in the dark.

If the present efficient system of defence goes on improving one will begin to feel that the more numerous the enemy's raiding machines may be in the future the better it will be for us, because there will then be more of them to bring down. Two machines brought down out of 25 may not seem a high proportion of casualties, but, in view of the smallness, dimensionally and numerically, of the target it means that there must have been some remarkably good shooting, whether by aeroplanes or guns is not made clear and does not much matter.

At any rate, they were fairly and squarely shot down and were not the victims of engine failure, as has been suggested by some of those who are always out to crab any Service work, whether they know anything of it or not.

* * *

A telegraph message from Amsterdam on Dec. 8th states that two German aeroplanes returning from the raid on England on Dec. 6th came into collision while flying over Belgium and fell near Gentbrugge (a suburb of Ghent).

The crews were killed and the machines destroyed.

THE GERMAN AIR FLEET.

Mr. G. H. Perris, writing from the Fhench Front on Dec. 10th, says :—

By the efforts of the past year, which I recently reported, General von Hoeppner has brought the strength of the German Aviation Services up to rather more than 200 squadrillas (*sic*) representing a total of about 2,500 machines. They are divided as follows :—

Bombarding squadrillas, 23 ; chasers, 40 ; protection squadrillas, 30 ; patrol squadrillas, 80 ; artillery squadrillas, 100 ; total, 273.

To these groups must be added the aeroplanes and hydroplanes (*sic*) of the Navy, a dozen or more garrison squadrillas, and about a dozen training groups.

I have before me a detailed account of the fate of rather more than 50 Zeppelins, which explains in the most satisfactory manner why these prodigious vessels no longer frighten the world, and so far as land operations are concerned can no longer be seriously counted in the Air Services. Apart from two destroyed before the war, the list may be summarised as follows :—

Destroyed in Germany	5
Destroyed in neutral countries or near the front	5
Destroyed in England, by the British Navy, or on their way home from England	15
Officers destroyed at sea	2
Out of use	5
In use as training schools	4
In use chiefly in the North Sea	9

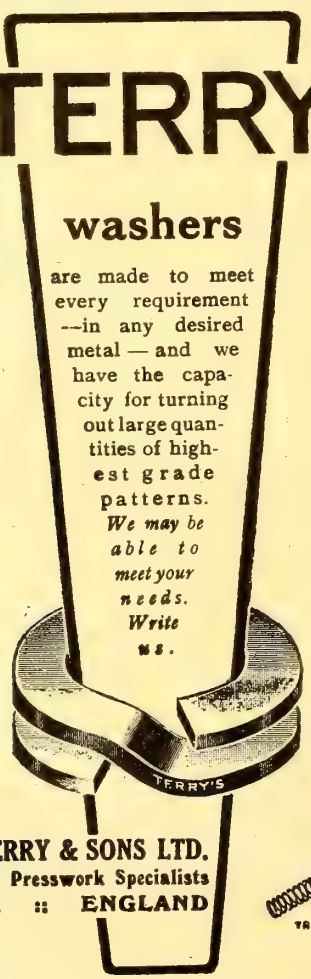
Considering the millions of pounds spent, and the unlimited hopes built upon these monsters, we may regard the result as one of the most conspicuous fiascos in the history of industrial and military science. [Which is absolute pure tosh.—Ed.]

SHOP STEWARDS.

Representatives of the Amalgamated Society of Engineers and kindred organisations who have agreements with the Engineering Employers' Federation met the employers in conference at the Midland Hotel, St. Pancras, on Dec. 7th, in regard to the question of the recognition of shop stewards and works committees arising out of the Coventry strike. Mr. Allan H. Smith presided.

In an official report issued to the Press it was stated :—

"After discussion it was found that the question was one which offered favourable possibility of adjustment on a constitutional

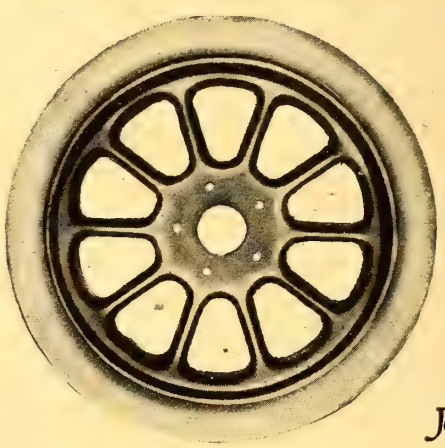


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basis. The employers agreed to give the matter sympathetic consideration. Shop stewards, as thus proposed, would form a new link in the existing constitutional procedure, and, if recognised on a constitutional basis, would form a useful means for keeping the unions in touch with workshop conditions as they vary from day to day. They would also afford additional means of bringing the management into closer touch with the workpeople employed in the factories."

The discussion was adjourned until to-day, Dec. 12th. Meanwhile the trade unions have urged on all their members that no steps should be taken which will interfere with the discussion now initiated, and thus imperil the possibility of favourable adjustment. It must be recognised that it is impossible to continue negotiations in an amicable and impartial spirit if workpeople seek to force the issue by resorting to local stoppage of work.

ASH TREES AND AIRCRAFT CONSTRUCTION.

During the past few weeks between 3,000 and 4,000 ash trees have been offered to the Government for the purpose of aeroplane construction, as the result of an appeal to landowners by the Aerial League.

It is expected that this offer will shortly be increased to 50,000 trees. This prospective supply, although large, is far below the demand, for it is stated that Government requirements in the next 12 months are expected to exceed 200,000.

The plan is to ask landowners to offer their trees standing at a price of 4s. 6d. a cubic foot, and the Government undertake to do the felling, carting, and general handling of the timber. At the same time, the League, of which Lord Montagu of Beaulieu is president, has arranged to plant two saplings in the place of every ash tree taken.

AMERICAN TRADE NOTES.

The Standard Aero Corporation has recently moved the major portion of its staff and machinery to a new $1,000,000 plant at Elizabeth, N.J., consisting of six individual shops.

In addition to the original place which existed at the time the purchase was made of the original property from John Stevenson Car Works, a new two-story aircraft assembly building has been put up, running the full length of the shops; barracks for the men have been built, ready to accommodate 250 men, each with separate rooms, with shower baths, etc.

Coincident with the moving of the main portion of the operating forces to Elizabeth, the Standard Aero Corporation has found it necessary to organise an additional company under the name of the Standard Aircraft Corporation under the laws of the State of New York.

These two organisations, under practically the same management, will divide their activities as follows:—

The Standard Aero Corporation of New York, operating at Elizabeth, New Jersey, will continue as an engineering and experimental organisation, doing principally aircraft engineering and experimental work.

The Standard Aircraft Corporation will be the production or manufacturing company, operating at the Plainfield, New Jersey, and Elizabeth, New Jersey.

Mr. Clifford Talbot, formerly superintendent of the new England Westinghouse firm, has taken charge as works manager of all plants.

Mr. E. E. Pennewill, formerly superintendent of the Standard Aero Corporation, becomes general manager, and Mr. C. V. Bradford, formerly general manager, becomes vice-president. The headquarters and main offices of the company will be at Elizabeth, New Jersey.

NOTICE TO INVENTORS.

¶ An engineering firm of high standing will entertain inventions of general utility or relating to Telegraphy, Telephony, Measuring, or Indicating Apparatus, with a view to purchase or working on royalty basis.

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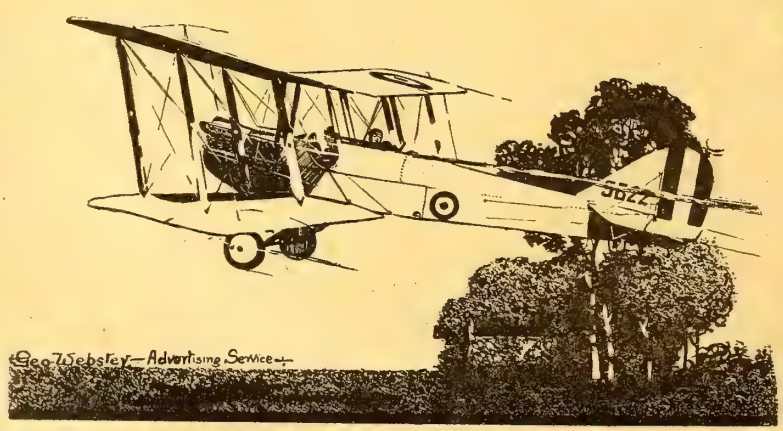


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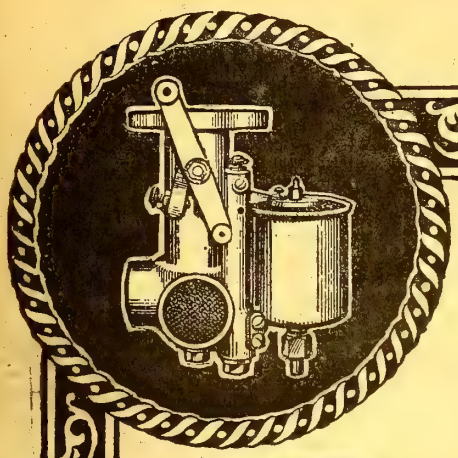
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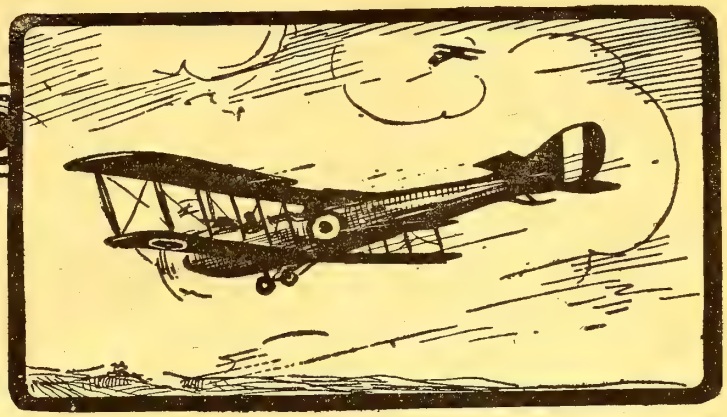


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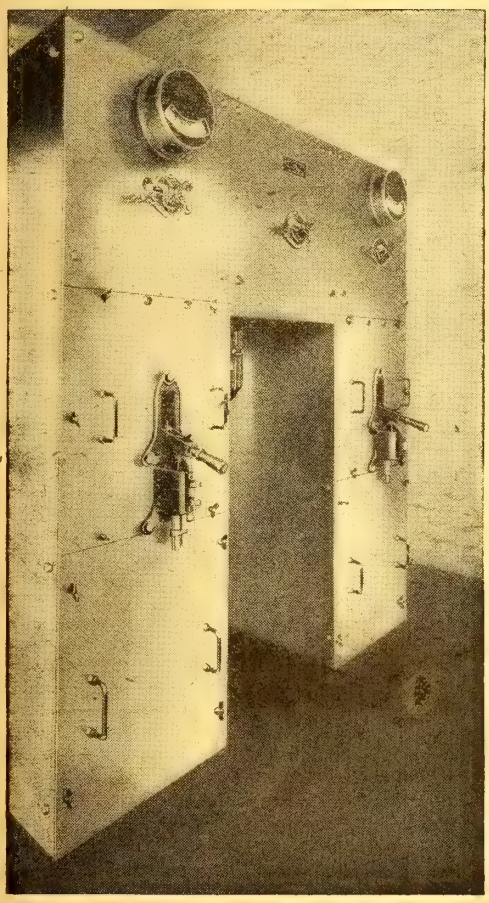




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The Whitehead Aircraft Co., Ltd., does not neglect to keep its employees, male and female, well reminded of the responsible nature of the work on which they are engaged. A notice appears in all the shops, displaying in bold, red letters the following admonition :—

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This very salutary warning calls to mind the notice which, even in peace time, appeared in the works of the Aircraft Manufacturing Co., Ltd., which said :—

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The terminals retail at one shilling per set of four, and soon save their cost in time, trouble, and temper.

A BIRD IN THE HAND.

From the "Daily Chronicle" of Dec. 5th :—

In consequence of complaints as to lights on railways at Hull, Lord French arranged to send a military officer in an airship to take observation, and the chief constable of Hull was invited to ascend in the airship. The Watch Committee, however, refused to give the chief constable official permission to ascend.

At a later meeting the matter was reconsidered, and permission was finally granted, the chairman expressing great solicitude for the Chief Constable, and saying that permission was refused in the first instance as it was felt that he would suffer from the cold!

One trusts that the gallant official did not ultimately suffer from pedal frigidity.

ITALIAN COMMERCIAL AVIATION.

The Industria Aviatori Meridionali, which has a nominal capital of 10 millions of lire, and a paid-up capital of three millions, is now adding another million to the paid-up capital, the shares being offered—at the ratio of one to every three held—to the present shareholders. The company which aims at developing Southern Italian air concerns, has for President of the Board of Directors, Dr. Canzio Bruno Canto.—T. S. H.

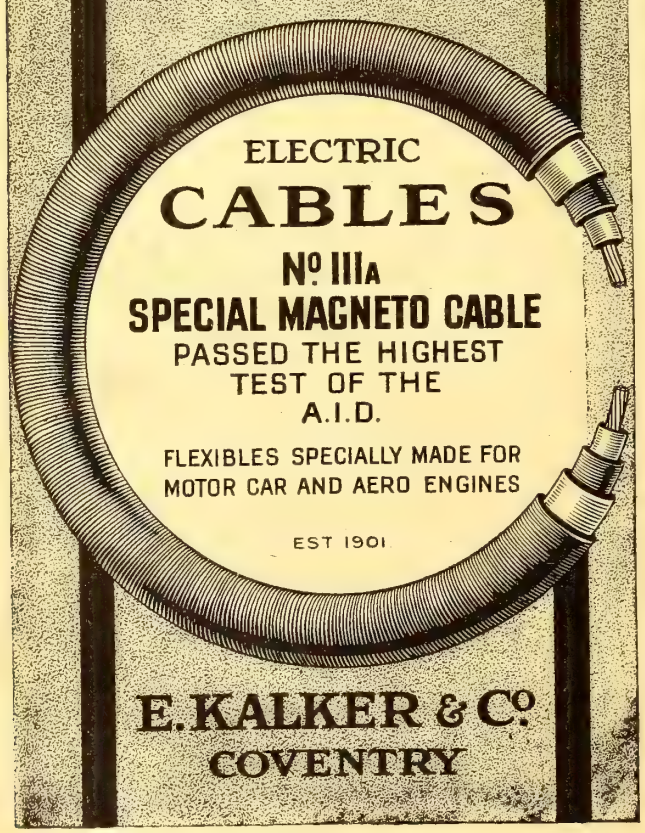
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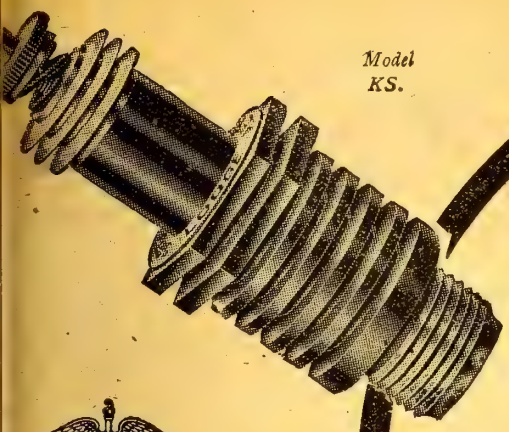
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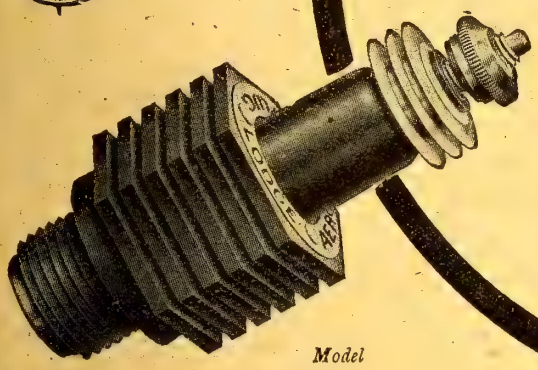
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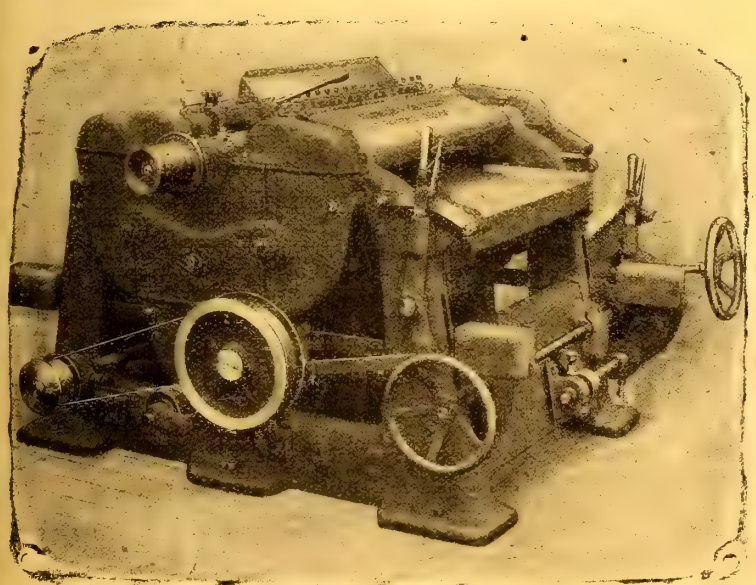
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Complaints are being received continually concerning the difficulty of obtaining THE AEROPLANE from newsagents and bookstalls. Owing to shortage of paper it has been necessary to discontinue the practise of supplying newsagents with an unlimited number of copies of this paper on the "sale or return" principle, consequently it is impossible for the bookstalls and papershops to keep a quantity of copies for chance sales. ¶ Nevertheless, everyone who places a definite order for regular weekly delivery with a newsagent ought to receive a copy with the regular Thursday morning papers. If any difficulty is found in thus obtaining delivery the proprietors of THE AEROPLANE will be glad to hear about it. ¶ Certain newsagents, rather than take the trouble to book regular weekly orders, have informed would-be purchasers that THE AEROPLANE has discontinued publication. The proprietors will be particularly obliged to anyone sending information concerning the circulation of this falsehood. As a matter of fact, THE AEROPLANE has never been in such a strong position as it is to-day. ¶ Those who still find difficulty in obtaining THE AEROPLANE, in spite of ordering it definitely for weekly delivery, may assure its arrival by becoming subscribers. They should then receive it by the first post every Thursday morning.

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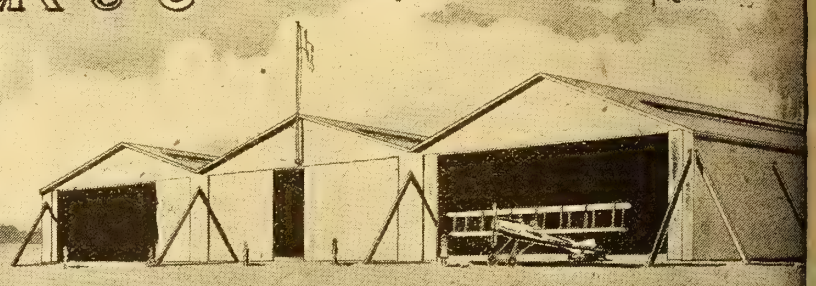
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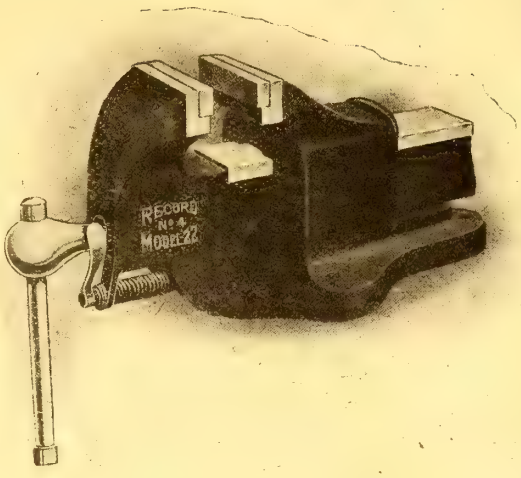
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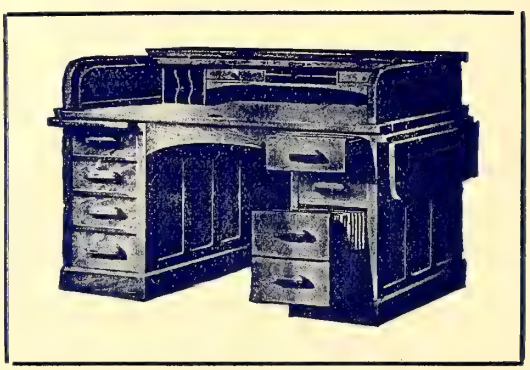
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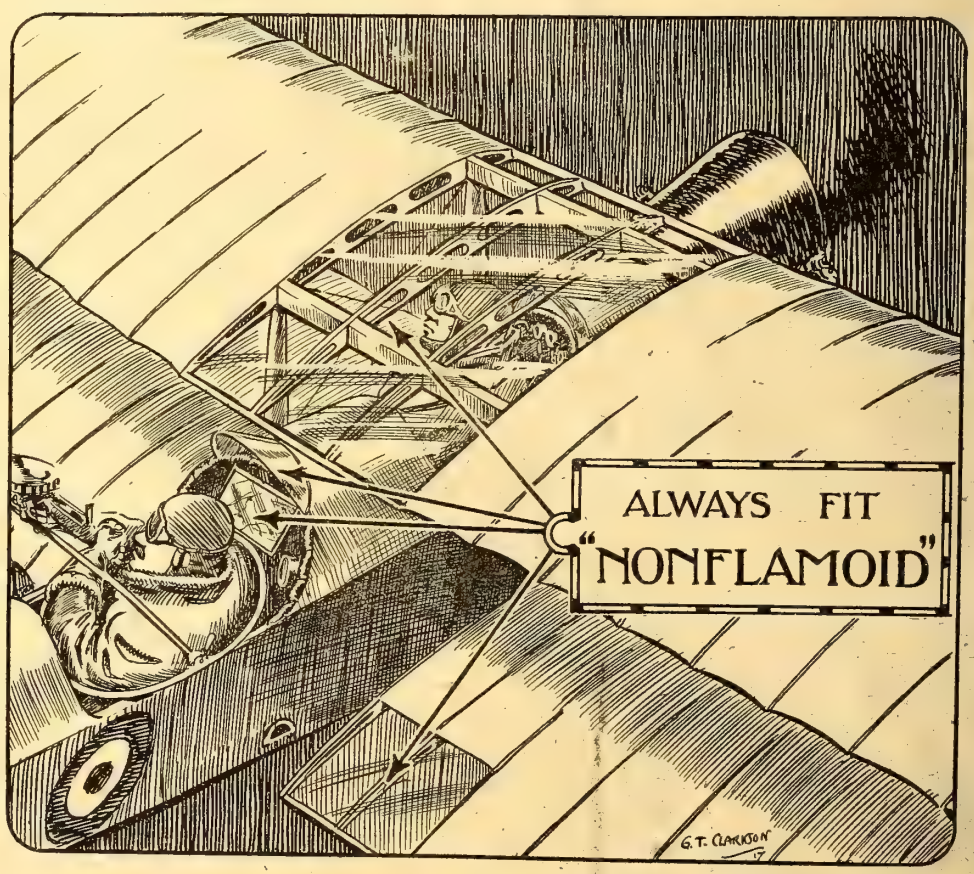
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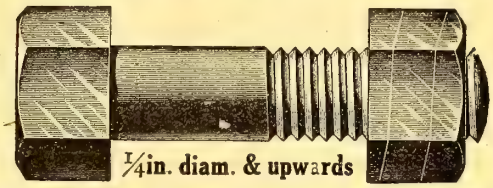
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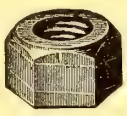
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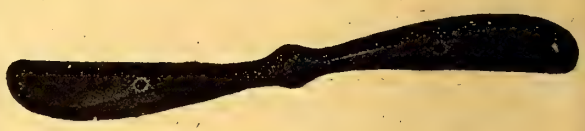
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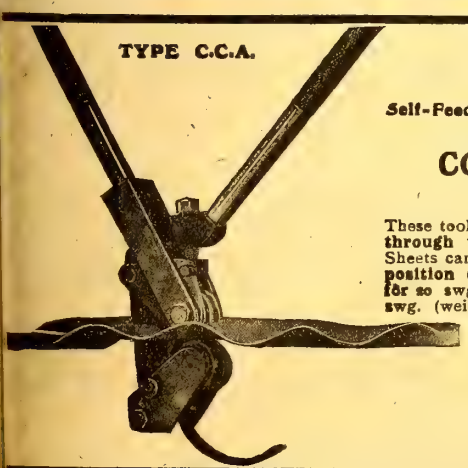
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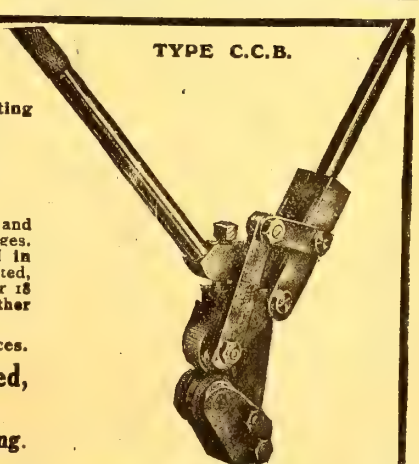
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ON SHOP-STEWARDS AND THINGS.

In a vague way people have gathered a notion from the daily news-sheets that labour trouble in general, and the recent strike in Coventry in particular, has arisen over the question of shop-stewards. What shop-stewards are, and why they should become a "question" of national importance, is not understood by the great British Public, and why they have been permitted by the Government to become a national danger is still less understood by anyone possessing even a rudimentary intelligence, except on the hypothesis that the Government is so afraid of losing its job that it dare not risk losing the Labour Vote. Having no statesman, or perhaps only one, in the present Cabinet, the Government has apparently not comprehended that the way to deal with the shop-steward movement is on the excellent old principle of "*Divide et impera,*" as I hope to explain hereafter.

As a matter of fact, Labour, in its truest aspect, is by no means unanimous in support of its shop-stewards, and even the shop-stewards themselves are not unanimous in their ideas, as is proved by the fact that the resolution to strike at Coventry was only carried by a majority of seven votes, which means that if only four other men in that assembly had thought more of their country and of their mates in the trenches than they did of their own stomachs there would have been no strike, and the country would have been richer by several hundreds of aeroplanes.

Be it remembered that in time of war aeroplanes, or any other munitions of war, which are not made are exactly the same as munitions which are made and are then destroyed. It means that the Army has not got them at the time when it wants them. And, as the late General Maude was so fond of impressing on his subordinates, "Time in war is everything." Which is why he conquered Mesopotamia when so many others had failed miserably. Other things being equal, a week of time wasted, as by the traitors of Coventry, means that the enemy's supplies of aircraft are greater than ours by precisely a week's output. And that is why shop-stewards are a national danger.

Primarily, a shop-steward is one of the men employed in a shop, elected by that shop as their representative to put their views before the employer or before their Trade Union, as may be the need of the moment. That is an excellent idea in theory, and none with any experience of handling men will object to the idea any more than he would object to Trade Unions in theory.

The trouble comes in because shop-stewards are, in the very nature of things, politicians, and no more represent the feelings of the best workmen than the members of the House of Commons represent the best feelings of the British People.. Or perhaps one should say that both shop-stewards and politicians do represent only too truly the worst elements of those who elected them.

A Clear Exposition.

A very clear exposition of the position as regards shop-stewards was published in the "Times" newspaper of Dec. 6th, and reads as follows:—

> The shop-steward movement is represented in some quarters as a movement for the gradual elimination of the employing element, as represented by managers and foremen appointed by employers, from industries and the handing over of the undertakings, first by workshops and then by works, to the charge of the workmen.
>
> In other quarters it is represented merely as an effort by the workmen to establish among themselves a stronger local authority, capable of more prompt and energetic action, than is provided under the existing constitution of the big national trade unions, whose seat of government is often remote from large industrial districts and whose leaders at headquarters are often believed to be out of touch with the feelings and aspirations of the rank and file.
>
> It is further thought by some that the movement is subversive of the ordinary methods of collective bargaining which have hitherto been followed, and destructive of the established trade union organisation; while by others it is contended that the movement is thoroughly "constitutional" from the trade union point of view.

Now there you have, clearly set forth, that division of opinion which any competent Government would use as a means of governing.

The Aims and Effects of Government from Below.

The first paragraph quoted shows the suspicion on the part of Capital that the shop-steward movement is towards Syndicalism, as is certainly is in many directions. The men in the shops begin by electing their own shop-stewards. Then, by a system of minor strikes, they will insist on electing their own foremen and charge-hands, in defiance of the wishes of the manager of the works. From that to electing their own works manager, and finally assuming complete control of the entire factory is a perfectly logical development. If all shops do the same thing it means that all manufacturing activities will be in the hands of the workmen.

What that means ultimately is best understood by looking at Russia, which is in a state of the perfectest anarchy, thanks to the Council of Workmen and Soldiers' Delegates. The Russians have murdered their proper leaders under circumstances alongside which the proceedings of the French Revolution appear like a Mothers' Meeting or a Sunday School Conference.

The people and the Army are starving—and serve them right. Part of the country is in the throes of civil war. Law and order have disappeared. Robbery, rape, and crime of all kinds, natural and unnatural, have full rein. And the only part of Russia which maintains decency and self-respect is the purely militarist section which belongs to the Cossack tribes.

Doubtless Russia's shop-stewards, the delegates of the workmen and soldiers, started with the best intentions in the world of bringing about the Millennium, but the Intelligentsia who backed the movement forgot that by an immutable law of nature government must come from above and not from below. Which is why the Gods have always been represented as being above the highest of human beings. Only the Australian black fellow worships the crawling things of the earth. And that is a fairly good argument for preferring to be governed by Kings, and Emperors, and Dictators, and Aristocracies, instead of by shop-stewards and members of Parliament.

Dissatisfaction with the Unions.

The second and third paragraphs from the "Times" indicate the joint in the harness of the solidarity of Labour. A large section of the men have got it into their heads that the people at the top of the Trade Unions, the old Labour Leaders, who by honest hard work have earned the trust and respect of all classes of people, have been "got at" by the Capitalists. Consequently, instead of following the sound advice of their leaders, the men prefer to be represented by younger men, elected direct by themselves, though without any experience of organisation or leadership, and to agitate by a show of hands instead of by the use of brains. Naturally the older and more respectable Trade Unionists regard this as "destructive of the established trade union organisation." So there you have a distinct split in the ranks of Labour.

Obviously it is to the advantage of the shop-steward agitator to foster the idea that the men's old leaders have been "got at," for he increases his own powers by doing so. The average workman, especially if he is a good man who takes a pride in his work, is a simple-minded soul, peaceful by nature but easily led, whether for right or wrong, and so the agitator finds him an easy victim. But the bulk of the supporters of the new movement are not the old skilled hands; they are, on the contrary, the unskilled young men, who flocked into the factories early in the war to dodge conscription, and now pose as skilled workmen on the strength of having worked with tools for a year or two.

In the early days of the war the Trade Union leaders made the fatal mistake of hustling all these young men into joining the Unions, so as to strengthen the Unions financially and politically, regardless of the fact that few, if any of them, had ever served their time to a trade, and so, according to strict Union principles, were not qualified to join at all. Now their number is so great that the tail is wagging the dog. Which rather serves the dog right, though it is an inconvenience to the rest of the household.

Most of these young men, though they have never learned a trade properly, have had more school teaching than the older workmen, and though they cannot be called better educated, they have read more, and they have a bigger vocabulary in consequence. The result is that their half-baked brains are full of claptrap phrases, which they think represent Socialistic ideas, whereas, in fact, they merely represent anarchy. In many cases this bigger vocabulary has endowed the owners with the gift of the gab. And these gabblers are the people who become shop-stewards, and bamboozle the good solid workers into thinking that the shop-stewards will right all their troubles. Which is precisely how candidates for Parliament bamboozle the electors into thinking that they will right the troubles of the nation, if elected.

The Proper Game.

Where the employers, in the Aircraft Industry and others, have made their great mistake is in taking these shop-stewards seriously, instead of treating them as the politicians which they are. When Walpole wrote of every man having his price he was only stating a platitude. In the extreme case of a really honest man, the price may be the setting right of the wrong which he is out to reform. And the price varies all the way down from that to a plain money bribe.

Where shop-stewards do happen to be honest, as some of them are, and where they have a genuine grievance, the price of peace in the shop is the adjustment of the grievance, and a remarkably cheap price it is. Where the shop-stewards are dishonest, as many of them are, the price of peace is a bribe of some sort.

In one aircraft factory of my acquaintance there was a shop-steward who was for ever making himself a nuisance with complaints, and leading deputations of the shop, and so forth. The works manager, who was quite a cute old hand at controlling men, stood it for a while. Then he made the chap a charge hand, raised his wages a penny an hour or so, and put him in charge of two or three men in an out-of-the-way corner of the works, where he had enough to keep him busy and not enough people round him to make it possible for him to raise an agitation. Never another word was heard from him as an agitator.

Some of these shop-steward fellows have a certain amount of real ability, and then it is quite sound policy to make them foremen, on the principle that the old poacher always makes the best gamekeeper, or "set a thief to catch a thief." Much in the same way, the wise Government dopes its more troublesome critics into silence by making them junior members of the Cabinet, or under-secretaries for something or other, or even appointing them to serve on Committees. It is merely a form of bribery, of course, but it is more respectable than a plain cash bribe, and consorts more easily with the Englishman's congenital Nonconformist Conscience.

Ruthlessness.

After all, why not sack a decent self-respecting hard-working old foreman, and replace him with a smart, scheming young shop-steward? Probably the older man will be snapped up by the Army and put into a labour battalion to break stones, but that can scarcely matter if peace is secured in the shop, if munitions come through quicker, and if in consequence the men draw more wages and the employer makes more profit.

The only thing that pays in war is ruthlessness used intellectually. It is no use considering anyone's feelings whether in a military war or in an industrial war. Germany has relieved herself of danger from Russia by ruthless fighting, accompanied by ruthless bribery and corruption behind the Russian Army. Internally Germany has kept her labour agitators under control by a combination of ruthless severity and ruthless scheming.

It is the same thing in the labour war. We palter and talk and negotiate and make weak attacks on weak places, instead of taking a firm stand on what we know to be the main points at issue, and then ruthlessly undermining the cause of the trouble, the position of the shop-stewards, by exposing them to their dupes. When once the decent class workmen understand that the shop-stewards are only politicians who are ready to sell their friends, just like any other politicians, then we shall have an end to these troubles.

A Square Deal for the Men.

The employers must be prepared, in return, to give the decent workman a square deal, and demonstrate to him that he is prepared to pay him by results, and pay him well. Much of the present trouble is caused by the stupidity of employers in trying to get £10 worth of work a week out of a man to whom they will only pay £3 a week, and in refusing to see that if a good man is really paid big wages he will do the extra work.

The employer who habitually pays more than the usual rate of wages can always get work done, because his people know that they cannot get the same wages anywhere else, union or no union. Therefore, the remedy is, pay the men well, make them comfortable and happy at their work, and show them that their precious shop-stewards are only a set of babbling politicians like those at Westminster.

Good and Bad.

Far be it from me to suggest that all shop-stewards are merely agitators or traitors to their country and to their friends in the trenches. Many of them are sound men who do their work well, and do their best to persuade others in their shops to do likewise.

It would be just as unjust to make out that all shop-stewards are traitors as to make out that all members of Parliament are crooks and grafters and place-hunters. There are some members of Parliament—not many in these days, one fears—who are fine specimens of the English gentleman, and who are in Parliament, not for what they make out of it, but because they believe they can best serve their country by associating with the self-seeking mob in the House of Commons, and trying to make them run straight.

Just in the same way there are thoroughly patriotic shop-stewards, who try to keep their fellow-stewards straight. The trouble is that the men themselves do not trust the very shop-stewards whom they have elected. No one steward is ever allowed to go and interview an employer by himself, he always has to have others with him, to see that he does not sell his mates.

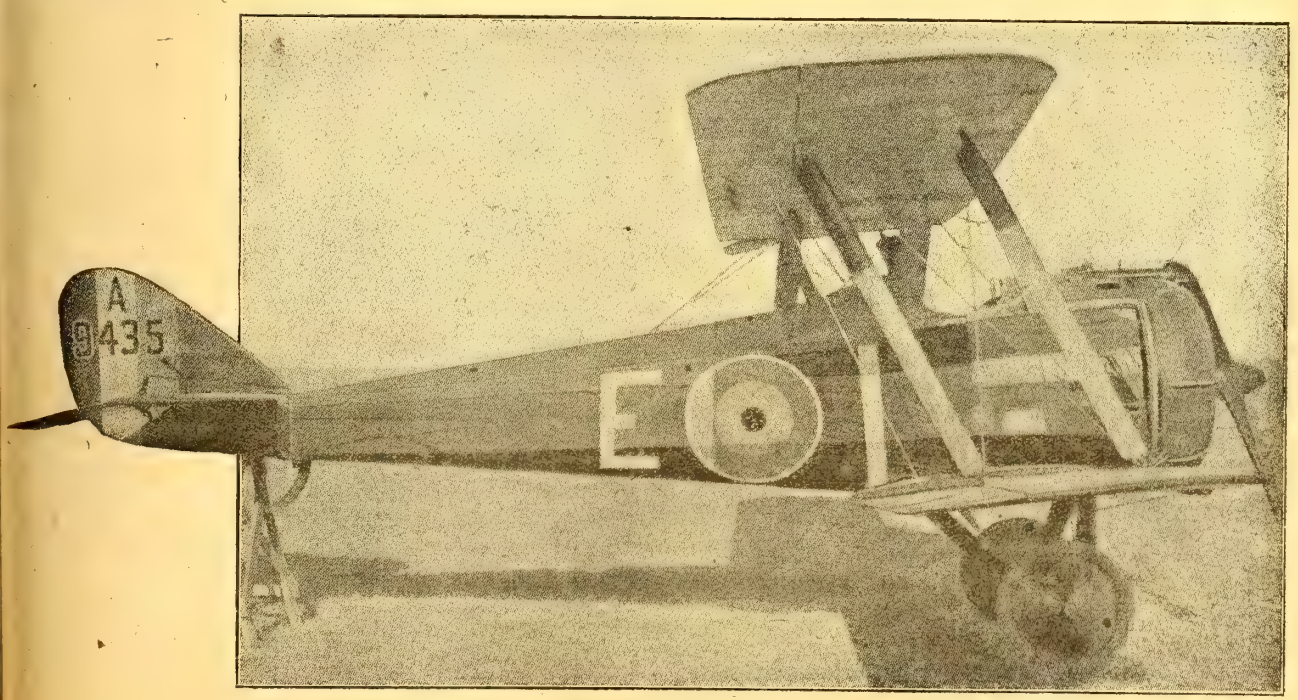
It would, I fear, take more of the honest and patriotic shop-stewards than we have got to pull the whole mass of workmen straight. But I do happen to know of a few factories in the Aircraft Industry where the best work, and the largest amount of it, is done, and where the employers openly ascribe their output to the loyalty of the shop-stewards.

And just as all men and all shop-stewards and all members of Parliament are not bad, so all masters and employers are not good. Mr. Alexander M. Thompson, writing in the "Daily Mail" the other day, said, apropos the Coventry affair:—

> A month ago the shop stewards' claim to recognition was acutely raised in Birmingham as well as Coventry. In both cases the employers decided to receive shop deputations, though not as shop stewards. But while the Coventry firms bungled the business by stupid insistence on untimely definitions, the Birmingham employers discreetly shut one eye and pretended to believe that their deputations were not shop stewards at all, but only human. If the Recording Angel noticed the fraud he surely rewarded the culprits with crosses of snow-white purity and splashed his lamp-blacking over the sticklers for exactitude.

Now, Mr. Thompson is about the soundest man the "Mail" has ever turned on to size up situations at short notice. His exposition of the Irish Question written on about five minutes' acquaintance with his subject was quite the best and clearest thing published on Ireland, though people born and bred in the country have tried to size it up from time immemorial. Therefore, one may take it that Mr. Thompson on Coventry is not very far wide of the mark either. Knowing both Coventry and Birmingham pretty well inside out, at any rate, up to nine or ten years ago, I recognise as true the different methods of the two cities as set forth by Mr. Thompson. That "insistence on untimely definitions" — a priceless phrase—is Coventry all over, whether it is a matter of shop-stewards, of entries in invoices, of phrases in business agreements, or of the right way to get to Heaven. Bluntly, it may be translated as "narrow-mindedness," but Mr. Thompson's way of putting it is prettier.

However, there you are! The men are much to blame, the shop-stewards, whether professional or conscientious agitators, are still more to blame. And I am quite sure that the employers are not free fro mblame by any means.—C. G. G.



(Reproduced from "Flugsport.")

The de Havilland Single-Seater Tractor Fighting Biplane. Note the backward stagger of the planes, and the polygonal fuselage. The example illustrated was captured by the Germans.

THE DEVELOPMENT OF THE AERIAL ARM.

BY HENRY FORESTER.

Those who earliest in the earth's history chose the profession of arms as an occupation in life were little burdened by preconceived ideas as to the best methods of eliminating an enemy. Strategy, even unconscious, formed no part of their warfare, and tactics had no ordered share in the conflict. The simplest and most direct means of dealing death were alone admitted in the early propriety of war. The prehistoric wars were joyously free from the dicta of dead warriors or the theory of the successful contemporary. Sheer strength coupled with a degree of good fortune gave the palms of victory to the happy warrior.

The infantry was the earliest arm. Later, those who marched discovered that to ride was not only pleasant but wise. The horse and the elephant provided the transport that the warrior might arrive unwearied on the battlefield. So in time cavalry was created.

Later still, the artillery, and so through the successive ages of progress. The practice of the art of war added daily and hourly to the mass of military knowledge. But no arm has first been produced in theory and has then taken an active and advanced part in the operations of war.

Napoleon's cavalry and Von Moltke's infantry were the product of the accumulated wisdom of the ages directed by the hand of genius. Nothing of note in the world can be created in a day, nor can it attain perfection without effort and experience.

The steamship of to-day is infinitely inferior to the vessel of a century hence, but it is vastly superior to the "Britannia," that first Cunarder which made the passage of the Atlantic in the forties of the past century. Each thing in the world progresses either upwards or downwards, save only bimetallism and the Nonconformist Conscience. Yet even the most rapid progress is slow when regarded in the light of centuries.

The Progress of Flying.

The art of flying, dreamed of in all ages, became possible in practice in the few years before the present war. Later still, the flying services came into an almost hesitant existence. In war, the aeroplane would clearly find its most immediate use, yet some of the greater nations had little faith. War was unlikely, save in the darker parts of the earth, where simple joys were still treasured and the stockbroker was in no position of eminence or even respectability.

The military theorists talked and wrote of the possibilities of aircraft with, in the mass, a single clarity of vision. Later events have proved much of their theory to be based on foundations of surprising solidity. As the theorists mainly were soldiers, they were given but scant hearing by the world in general—a world possessed of a strange thirst for night clubs and the brilliancies of the dark hours when none could be expected to see clearly.

The View of the Visionaries.

It was clearly realised that the primary duties of the aeroplane in its first stages of development were as the eyes of the army and navy. No longer would the element of surprise exist. Murat and his cavalry, had aeroplanes existed in the days of the great Emperor, could not have screened the preparations for an Austerlitz. Nelson need not have sailed to the West Indies in search of a fleet which had sailed elsewhere. And in the future aeroplanes would prevent the recurrence of such errors of judgment. The use of aeroplanes to assist artillery in its work was also realised. The more eager of the theorists ceased to have patience with the existing science of gunnery, and were apt to forget that revolutions are rarer in the art of war than in the feuilleton of the daily news-sheet.

A second use, both at sea and over land, was in destroying enemy shipping and fortified positions by bomb dropping. The apparent ease of the work misled many. It was only necessary for an aeroplane to carry heavily charged projectiles over the selected positions, drop them at the right moment, and the virtuous work was accomplished. Future war would begin with the demolition of enemy capitals.

As to fighting in the air, it was understood to be possible, but unlikely. None cares to enter into a contest of which the probable end is mutual destruction, and it was thought by many competent to speak on such matters that aviators would, if possible, avoid aerial combat. For one thing, it seemed unlikely that there would be sufficient machines to spare for this side of war.

Matters of History.

The three great races, the British, the Germans, and the French, were all in apparent agreement as to the uses of aircraft, though the respective opinions as to the value of the aerial weapon differed greatly.

The deeper thinkers thought, it would seem, that the aeroplane would become highly important in war and that the flying service would prove its right to equal consideration with the other arms of the service. Others, less responsible, and therefore less held to immediate realities, foresaw impossible visions of aerial warfare transcending all the glories of past war. The rest never thought at all, and they were in the majority.

France made preparations for the use of the aerial arm, and formed an air service which was a ready means of filling the pockets of manufacturers and soldiers alike. Many machines were purchased, but few were of value in military work. Italy formed a splendid organisation on paper and partly worked it out in practice. Great Britain, because the Government did not believe in war timidly brought together a small flying unit, which was as efficient as are all things undertaken by the British soldier, save glee clubs and politics. Germany, alive to all the risks of greatness, organised an aerial arm of proportionately great size, equipped with the finest types of aeroplanes then in existence.

Yet no nation had any real idea of the true dimensions to be desired in the new service, if an overwhelming superiority were to be gained and maintained in the early stages of war, and none had grasped the secret of the speed of development in aeronautics.

At the time when stagnation was beginning to set in over the sea of aeronautics, the old spirit revived, and war broke out again over the historic battlegrounds of Europe. The theory of the years of peace were at least put to the touch.

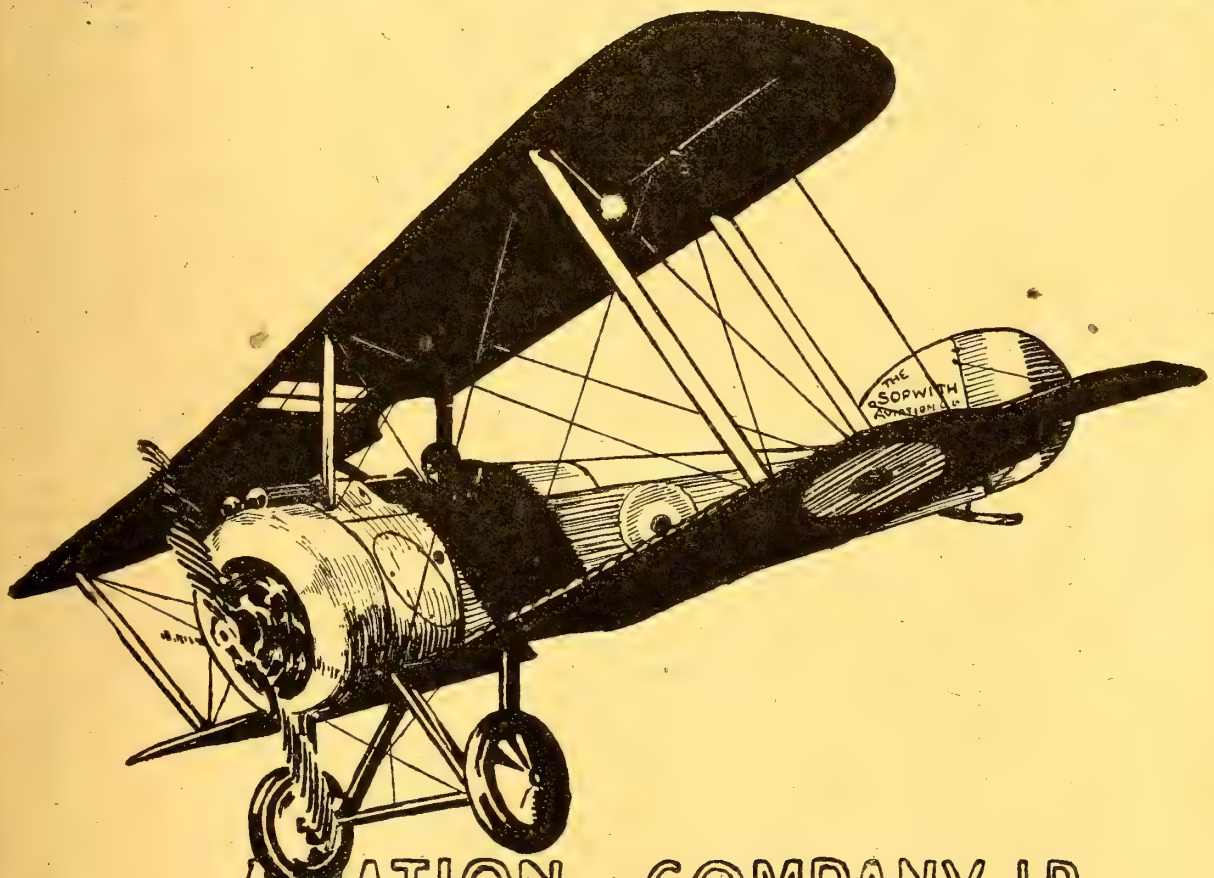
Recent Years.

The war has now been in progress for over three years and it is possible in some way to modify and extend the views of aeronautics which were held in pre-war days. In some cases the ideas of those days which were found to be unworkable and absurd in the early period of the war are now returning to favour. The psychology of the race has changed, and the new conditions have produced new features.

In reconnaissance, up to the present the most important work of the aeroplane, the rough improvisations of early days are fast being moulded into an exact science. In the beginning it was found that the pre-war height of 3,000 feet in reconnaissance was unsafe, and the altitude

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of such flights was increased by degrees until it was not unusual for pilots to fly at 12,000 feet in the search of information, with a consequent reduction both in the detail and the accuracy of the reports received on the ground. As time went on and knowledge accumulated, the height of reconnaissance flights decreased until at the present time pilots frequently pass over enemy positions no higher than 1,000 feet if the information sought for is of sufficient importance.

Early Aerial Photography.

Photography from the air in the beginning was comparable in its scale and results with the work of the unconscious caricaturists who immortalise in tintypes the wholly reprehensible features of the British tripper on his annual visit to the seashore. The same obscurity of design, the same charm of mystery blended with wonder at anything having happened at all, are present in both cases.

Aerial photographs were taken laboriously with cameras not designed either for simplicity or speed. In the result the area photographed was somewhat spasmodically recorded by the lens. Thus only points of importance were ever photographed, and then great credit was due to the perseverance and pluck of the pilot photographer.

To-day the ground for many miles behind the German lines is photographed on every day when the weather permits. The maps on which operations are based come into being from the carefully connected prints of the day's reconnaissance. No movement made in the German lines escapes record, if its importance is sufficient. The Field-Marshal Commanding-in-Chief is no longer at the mercy of inaccurate maps, nor is he left to guess the means of road communication possessed by his stubborn enemy.

Artillery Observation.

In the beginning of the war the guns were directed from aircraft by means of signals fired clumsily and none too surely from the machines. The variety of signals which could be given in this manner was not great, and the results were but little better than would have been obtained from use of flank observers on the ground.

Wireless, then a little uncertain and cumbrous when used in aircraft, is now highly reliable and simple. By its means a series of detailed signals can be submitted in a constant stream to the guns, with the addition of such impertinences *en clair* as strike the humour of the pilot. Its range is sufficiently great to be serviceable under any conditions with any guns now in use, and its reliability it but little less than that of an ordinary ground set. Yet in days shortly to come all this will be as obsolete as the polite hackney-carriage driver. Possibly the long-dreamed-of wireless telephone will add another horror to life above and below.

Bombing Stunts.

Bomb dropping, the delight of the cheap romanticist, has proved a disappointment to the sanguine inexperts who so freely prophesied in the days when everyone knew that wars had ceased for ever in civilised climes. Its amazing inaccuracy can be gauged by the amount of intentional damage done by enemy aircraft visiting these shores at various times during the past three years.

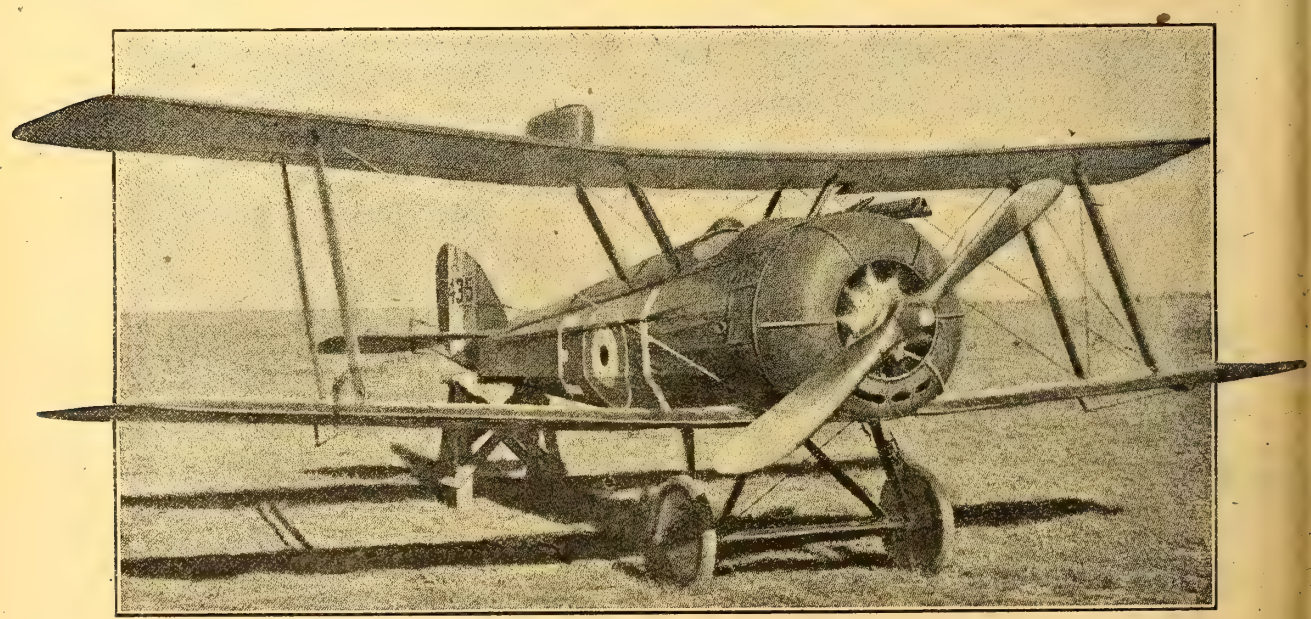
For all the expenditure of men and money made by the Germans in this matter of aerial bombardment, there is little tangible to show. Damage has been done, it is true, but the real objectives have escaped injury, unless, of course, it is true that the continued existence of one or two public offices is supported by the Germans.

There is little reason to believe our raids over land in German possession to be more successful, save in those cases where pilots gallantly descend to a height of a few hundred feet before releasing their bombs. Bomb dropping can never be so exact a science as is the use of torpedoes at sea.

The moral effect of bombing is high in the earlier stages, but later becomes negligible when the population of the bombed area realises the small damage effected.

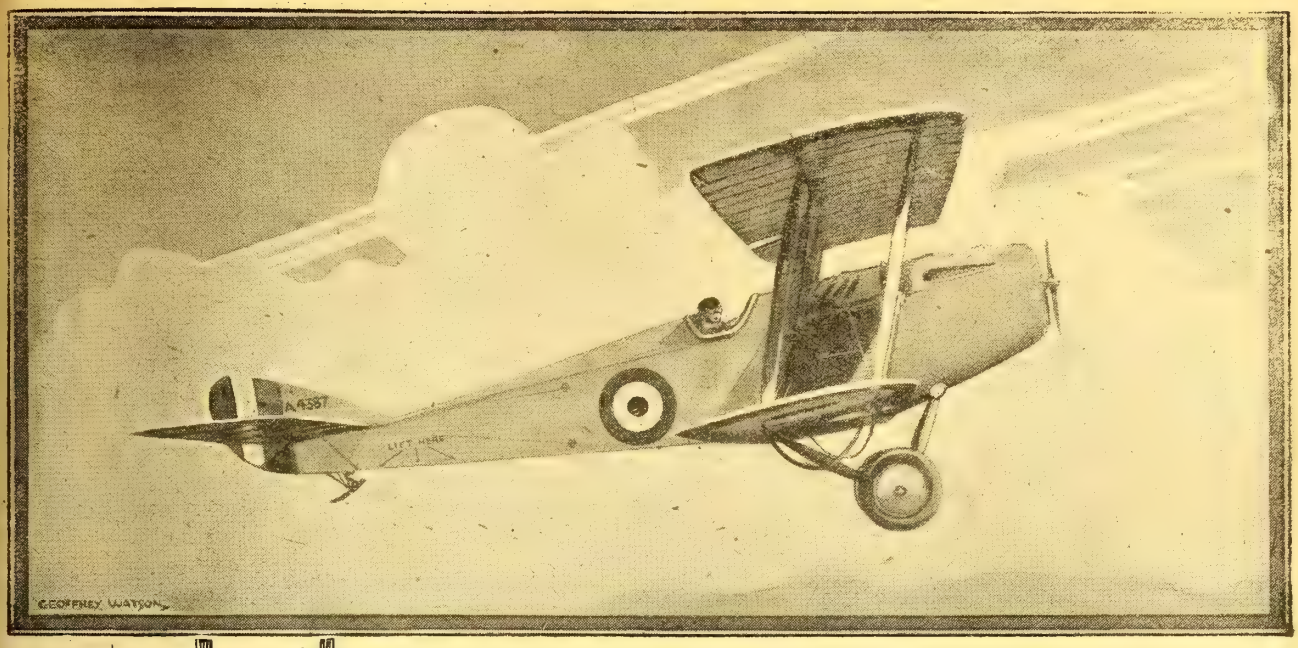
The Aeroplane of Assault.

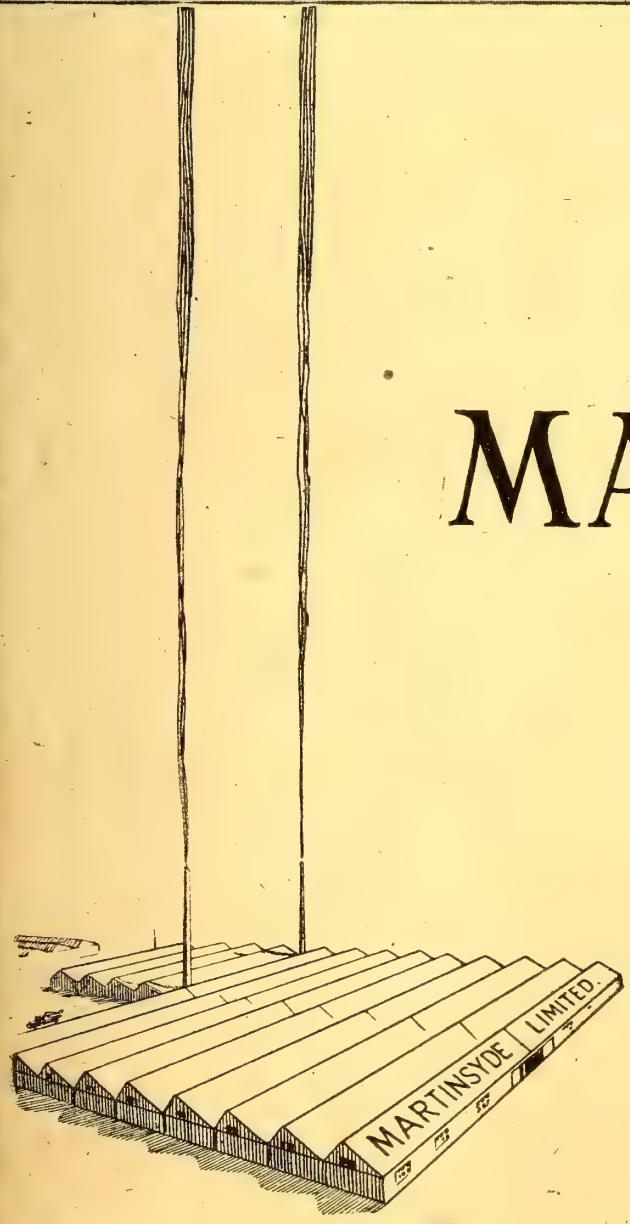
The outstanding feature in the development of the aerial arm is the use of aeroplanes in the assault of a position. None of those who prophesied so freely in the days of peace could foresee that in so short a space, or even at any future time, aeroplanes would undertake a very real part in shock action against troops on the ground. It would have been considered an operation necessarily involving such severe losses in the attacking aircraft that any local success gained would be almost entirely nullified. In truth, the reverse has been proved to be true.



(Reproduced from the German Aeronautical Journal, "Flugs

A three-quarter front view of the de Havilland Single-Seater Fighting Biplane. The projection on the top plane is a reserve fuel tank.







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KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

In the present stages of the war the British aeroplane is ubiquitous. No aerodrome in enemy occupation is left free from unwelcome visitants from the British lines. The ground and the sheds are swept by machine-gun fire at so low an altitude as ensures a high degree of damage. Columns en route for the front, trains on strategic railways, first trenches and reserve trenches, artillery in position are all visited ceaselessly with terrible results on enemy *moral*. The material damage is repairable, but the moral effect remains, and leaves a deadly mark. Once the confidence of the enemy troops is destroyed victory is never far to seek.

Aerial Supremacy.

The attack by aeroplane is a serious feature in war. Each of the other duties of aircraft are developments in warfare to which answers are obvious. The work of one army's aircraft counterbalances that of another, unless a complete aerial supremacy is established by one side or other, which, in effect, means that victory had come to that side.

A decided supremacy in any arm of the Service is a ready key to victory, and the aerial arm must be considered in the same manner. But the attack by aeroplane is of vital immediate importance. Unless it is answered similarly, defeat will follow, owing to the resulting degeneration of the attacked troops, which is out of all proportion to the damage done.

The First Vital Change.

When armoured aeroplanes enter the conflict, and the supplies of aircraft are equal to the demand, it is difficult to foresee the manner of conflict in the future battle. It is the first vital change in the operations of war since the introduction of artillery.

There must be an answer, for no problem in war remains one-sided, but whether that answer will come from the air or the ground is as yet undetermined.

LORD ROTHERMERE'S CONFESSION OF FAITH.

The Prime Minister, the heads of the Flying Services, and some prominent members of the Aircraft Industry were the guests at a dinner on Dec. 14th given by the Treasurer (Sir Frederick E. Smith, Attorney-General) and the Masters of the Bench of the Honourable Society of Gray's Inn.

The assembly included Bench and Bar, the Archbishop of Canterbury, the Home Secretary, the Lord Chancellor, the Lord Chief Justice, the Duke of Westminster, the Italian Ambassador, the American Ambassador, Admiral Sims (United States Navy), Sir Edward Carson, General Smuts, the Secretary of State for War, Mr. Winston Churchill, and Mr. G. N. Barnes.

Mr. Lloyd George, who was received with loud cheers on rising, said: "Let me express how honoured I feel to be invited to this historic building to meet representatives of the most romantic Service in this war. In the House of Commons I gave what I fear must be regarded as inadequate expression to the gratitude and admiration which the nation feels for this gallant Service. I have sometimes felt that the operations of the Air Service will probably have greater effect in determining the nations that this must be the last war than any other weapons, however terrible their effect."

After such an opening, and after the speaker expressing the idea that "this must be the last war," it scarcely seems worth while to report any more of Mr. George.

Sir Frederick E. Smith, who is probably better known to people in the Aircraft Industry as a visitor to the late lamented Ciro's Club than in his official or legal capacity, proposed the health and prosperity of the "Air Service."

Lord Rothermere, in response to the toast, said, in the creation of the new force a great work of consolidation and unification was called for. "When, in succession to Lord Cowdray," he continued, "I decided to go 'over the top' with the Prime Minister, and accepted the position of Air Minister, I did so with the full confidence that the two senior Services, the Navy and the Army, would extend ungrudging assistance and support to the new Service, the Air Force, which is now being established. My brief experience of a fortnight has proved to me that my confidence has not been misplaced. I feel that, instead of the rebuff which people prophesied, I shall, whenever I require assistance, find a helping hand extended to me, both by the Navy and the Army.

"Without such assistance it would be impossible for any man to make a success of the position I hold. It is no easy matter to dissever the aerial branches of the Navy and the Army, and weld them into one whole. It is a gigantic work of organisation. The Royal Naval Air Service and the Flying Corps are two distinct bodies with different ranks, different rates of pay, and different organisations.

"At the Air Board we are whole-heartedly in favour of air reprisals. It is our duty to avenge the murder of innocent women and children. As the enemy elects, so it will be, the case of 'eye for an eye and a tooth for a tooth,' and in this respect we shall stave for complete and satisfying retaliation." General Ludendorf proclaims the war a war of nations, suggesting that the civilian population is as much a mark for the airman's bombs as the fighting man. We detest these doctrines, holding them to be grossly immoral. [Then it is time Lord Rothermere studied logic and natural history.—Ed.] But fighting for our lives and the lives of our women and children, we cannot and we will not consent to their one-sided application. We have too much at stake in this contest to concede any advantage to a treacherous enemy. He has to learn in this, as in larger things, that it does not pay. We are determined, in other words, that whatever outrages are committed on the civilian population of this country will be met by similar treatment upon his own people."

The great asset of the Flying Services, he added, was the young Britisher, whether born in these islands or in the Dominions overseas. He made the ideal fighter, courageous, daring, with heaps of initiative. Our duty was to see that he obtained all he wanted. [An excellent resolution. Let us hope it may be put into effect.—Ed.]

His brief experience taught him that the production of aircraft in great numbers was not the easy task that many people imagined. If the aeroplane had reached its ultimate development, the task would not be anything like so difficult, but hardly a month passed without some step, very often a great step, being made in the improvement of the aeroplane. The output of machines had increased in a most satisfactory way, and he had no doubt that at the present rate of progress it would not be long before the many criticisms which had been levelled at the Air Ministry were silenced.

Lord Rothermere, in conclusion, quoted the words of the greatest of the Treasurers of that Inn, Lord Chancellor Bacon, as the best advice to an Air Minister of to-day that could be gained from the Wisdom of the Ancients: "The condition of weapons and their improvement" (he said in his famous essay 'Of the Vicissitude of Things') "are, first, the fetching afar off, for that outruns the danger. . . . Secondly, the strength of the percussion. . . . The third is the commodious use of them, as that they may serve in all weathers, that the carriage may be light and manageable, and the like."

Commodore Godfrey Paine and General Sir David Henderson also replied.

FOR INVENTORS.

Under the direction of Lord Rothermere an Air Inventions Committee, which was nominated by Lord Cowdray, prior to his resignation, has been set up, and will be in operation immediately at No. 2, Clement's Inn, W.C.2.

The Committee is as follows:—

Mr. Horace Darwin, F.R.S., Chairman.
Major-General Ruck, C.B., C.M.G., Vice-Chairman.
Sir Dugald Clerk, K.B.E., F.R.S.
Sir Richard Glazebrook, F.R.S.
Professor H. L. Callendar, F.R.S.
Professor C. H. Lees, F.R.S.
Professor J. E. Petavel, F.R.S.
Mr. L. Bairstow, C.B.E., F.R.S.
Lieutenant-Commander Wimperis, R.N.V.R.
Major G. Taylor, R.F.C.
Captain B. M. Jones, R.F.C.
Captain A. V. Hill, Munitions Inventions Department.
Mr. J. P. Millington, and
Mr. F. W. Lanchester.

The main function of the Committee will be to investigate inventions submitted to it. It will develop and put into operation as soon as possible any invention which promises to add to the efficiency of aircraft.

Communications regarding inventions should be forwarded to the Air Inventions Committee, No. 2, Clement's Inn, W.C.2.

[Lord Cowdray is to be congratulated on his sound common sense, and his sense of humour. Inventors of all sorts will now have the satisfaction of having their brain-waves considered and turned down by a committee of the most prominent names connected with aeronautical science, while the men with plain practical experience in the Technical Department will be disencumbered of these hindrances, and will be able to get along with their useful work on the plain practical ideas introduced to them by people who are not inventors but merely those who know how things are done.—Ed.]

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AIRCRAFT IN THE LORDS.

On Dec. 11th **Lord Tenterden** asked the Government and the Air Ministry to afford greater facilities for the construction of small tools of precision indispensable to aircraft; and inquired if the Minister for Air had decided who were to be the members of the Air Council; and, if so, who would be entrusted with the speeding up of the output of precision tools essential to the construction of a big Air Force. He also asked whether the Government contemplated taking control of the whole output of precision tools, and the effect of such a measure on the output of aircraft, and inquired into the conditions of the small tool trade generally, and the present position of the machine tool trade.

The **Marquess of Crewe** said the position of the machine tool industry was one of extreme importance to the country. Many people had fallen into the habit when dealing with trade rivalry of speaking as though Germany were the only country concerned. But in this matter the fact that the machine tool trade was so dormant in this country in comparison with America was due to the greater activity which for many years had been exercised in the United States. All the best machine tools now at work had come from America, and most grateful we were to our American cousins for providing them. Now that they were in the war themselves, however, the supply might not be kept up. There was no subject in which the play of individual minds—the tendency towards particular small improvements, sometimes almost daily and weekly carried out—was more prominent than it was in the business of machine tool making and using. Therefore, he hoped that any Government control that it was intended to apply would not in any way interfere with enterprise and invention either of firms or of individuals.

Lord Elphinstone said he had been asked to reply to the question, as it really affected the Ministry of Munitions to a very much greater extent than it did the Air Ministry. The facts of the situation were that the whole output of small tools was dealt with and had been dealt with by the Ministry of Munitions alone, a section of the machine tool department of the Ministry having been set up by that department some time ago. It was the intention of that section to increase supplies and to accelerate deliveries, and to generally control the distribution of small tools required by the Aeronautical and other Government Departments. Every possible facility was now being given for the construction of small tools, and he assured their lordships that the Ministry of Munitions were fully alive to the importance of the question of increasing the output from every possible available source. Before affording financial assistance for providing machine tools they were bound to satisfy themselves that there was at any rate reasonable prospect that that assistance would be made use of to the fullest extent, and also that the maximum advantages would be got out of such financial assistance. The Government had had control of the supply of tools for a period of two years. The position of the small tool trade was considered to be satisfactory. The output had increased very largely since 1915, and all the demands, so far as they could be foreseen, could be dealt with. The machine tool trade was in exactly the same position. The output had increased to an enormous extent since the beginning of the war. Everything was being done to increase the dilution of labour so that skilled men employed in the trade could be utilised to the best advantage.

Lord Rothermere replied to the inquiry whether he had decided, as Minister for Air who were to be members of the Air Council. He said that he could only inform the noble lord that an Order in Council under the Air Force Act would be issued at a very early date. This would define the constitution of the Air Council, and provide for representatives of the Ministry of Munitions to be associated with the Council.

AIRCRAFT IN THE HOUSE.

On Dec. 17th, **Sir G. Cave,** replying to Brigadier-General **Croft,** who called attention to the comments of the "Labour Leader" of December 6th on an appeal for toys for the children in Elizabeth Hospital, alleging that some of the bombs which wounded little children belonged to the Allies, said:—I have read the statement referred to. If the writer meant to suggest that any of the children in the Elizabeth Hospital at Poperinghe were injured by bombs dropped by the Allies he was, of course, making a deliberate misstatement. But if he intended only to suggest that Belgian children may have suffered by the bombardment of places of military importance in Belgium, he was making an assertion which cannot yet be either proved or disproved; and in view of the ambiguity of the paragraph I do not think that proceedings could be taken in respect of it. I would, however, point out that while we have endured for three years the wilful and deliberate attacks by the Germans on the civil population, including women and children, the whole country is aware that the Royal Flying Corps in their attacks on the enemy's strongholds in Belgium have done their utmost to avoid injury to the Belgian inhabitants.

INVASIONS OF ENGLAND.

The Press Bureau is authorised to state that the two German aeroplanes brought down during the raid on the morning of Dec. 6th were both hit by anti-aircraft guns, and were forced to descend owing to injuries received.

A NEW APPOINTMENT.

The Minister of Munitions has made the following appointment:—

Sir William Weir, Controller of Aeronautical Supplies, to be Director-General of Aircraft Production.

WORK FOR THE SEAPLANE.

The "Times" of Dec. 18th offers the following observations on the German destroyer raid which resulted in the loss of a British destroyer and a convoy of Allied merchantmen on Dec. 12th:—

We trust that when the results of the inquiry are announced Sir Eric Geddes will endeavour to give some information about the relation of the Air Service to attacks of this character. He has told us that "during one month the aircraft patrol round the British coast alone is more than five times the circumference of the earth." Is there any possibility that aircraft can be more effectively used in order to prevent a repetition of these raids? No doubt the imperative demands of the Western front have limited the number of aircraft available for sea scouting until Lord Rothermere is able to accelerate production, but we should be glad to know that sufficient use is being made of such protection as air observation furnishes.

THE UNCONSIDERED VIEW.

Rear-Admiral Robert E. Peary, who is identified with the development of the much-advertised aerial programme for America, predicts German attacks in the near future on American coast cities.

Regarding the developments of the carrying capacity of aeroplanes, Admiral Peary says:—

Perhaps before the war is over, but certainly in the next war, if we have another, these aeroplanes will carry as heavy artillery as the famous French 75's, and when that time comes the aeroplane will be invulnerable. They will be able to soar over any field, water, or mountainous country, carry enormous numbers of troops far behind the enemy lines, and do the work of cavalry, infantry, and artillery combined.

To speak of any weapon as being invulnerable is absurd. The aeroplane carrying 75 m.m. guns is vulnerable to anti-aircraft guns and to aeroplanes carrying still heavier guns. Whoever heard of a warship being invulnerable?

AIR RAID COMPENSATION.

An association, which claims to represent, through municipal authorities and other public bodies, a population of over 32 millions, calling itself the Committee on War Damage, which was established in October, 1915, has issued a circular on the recent concession made by the War Cabinet, under which compensation will be granted in regard to property damaged by air raid and bombardment up to £500.

The Committee points out that this does not carry out the principle of national responsibility accepted by the Prime Minister in July last, for it leaves out of account all damage done above this amount, and gives no compensation to those who were raided and bombed before September; while to withhold compensation in cases of personal injury cannot be defended on any grounds.

The Prime Minister has not yet fixed a time for receiving a deputation from the Committee, when it proposes to put these views before him, and to urge that the war damage insurance premiums the Government have received represent money demanded under a misapprehension on their part of the extent of the nation's responsibility, and now that responsibility has been recognised all justification for retaining the money vanishes.

A WORD OF PRAISE.

At a meeting of the League of Londoners in the Central Hall, Westminster, on Dec. 17th, Mr. Cuthbert Wilkinson, L.C.C., presiding, it was decided, on the proposal of Colonel Sydney Ashley, to send a resolution of congratulation to the Air Minister, Lord Rothermere, "on his outspoken, courageous, and emphatic speech on the question of air raid reprisals on Germany, after the postponement of promises hitherto made, but apparently without fulfilment."

MAN-POWER.

The House of Commons Tribunal last week granted exemption till February to a skilled engineer named Bridgland, who, while anxious to join the R.F.C., was taken by the Army and put to plate-washing. His solicitor told Sir Donald Maclean yesterday that, notwithstanding the exemption, the Army had refused to release him. He was still in khaki.

Captain Anstey, the military representative, said that he had sent a telegram to the commanding officer ordering that the man should be released temporarily in order to bring him under the tribunal's jurisdiction. The solicitor remarked that it might be a month before Bridgland was released, and asked for an immediate order. The tribunal agreed.

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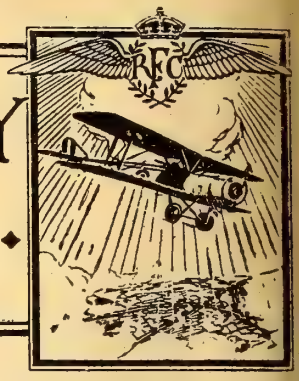
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NAVAL and MILITARY AERONAUTICS



FROM THE "LONDON GAZETTE."

Admiralty, Dec. 5th.

With reference to the notice which appeared in the "Gazette" of Nov. 16th, the entry respecting Flt.-Lt. R. H. Collet, D.S.C., should read as follows:—Flt.-Lt. R. H. Collet, D.S.C., R.N., who relinquished his commn. on account of injuries received on active service, to retain his rank, Oct. 29th.

Admiralty, Dec. 6th.

Dec. 8th.—To be temp. Flt. Lt.: Henri Jullerot, Dec. 5th, 1917.

War Office, Dec. 11th.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing.—Staff Officer, 3rd Cl.—(Graded as a Staff Capt.).—Lt. V. Buxton, Leic. R., from a Flying Officer (Observer), and to be temp. Capt. whilst so empld., vice Capt. B. G. M. F. Nixon, Ind. Inf., Oct. 2nd.

Special Appt.—(Graded as a Park Comdr.).—Temp. Lt. (temp. Capt.) E. G. Toye, Gen. List, from an Equipment Officer, 1st Cl., and to be temp. Maj. whilst so empld., Nov. 16th.

Adjt.—Capt. B. G. M. F. Nixon, Ind. Inf., from a Staff Officer, 3rd Cl. (graded as a Staff Capt.), vice Capt. W. H. L. O'Neill, Ind. Inf., Oct. 2nd.

* * *

In a despatch from Field-Marshal Sir Douglas Haig, Commander-in-Chief of the British Armies in France, the following officers are mentioned for distinguished and gallant services and devotion to duty during the period from Feb. 26th to midnight of Sept. 20th and 21st last:—

THE ROYAL NAVY.

Chambers, Wing Comdr. E. T. R., R.N.; Collishaw, Actg. Flt. Comdr. R., D.S.O., D.S.C.; Dallas, Sqdn. Comdr. R. S., D.S.C.; Halahan, Wing Capt. F. C., M.V.O., R.N.; Jenner-Parson, Flt. Lt. C. H. B.; Little, Actg. Flt. Comdr. R. A., D.S.O., D.S.C.; McNeil, Flt. Sub-Lt. P. G. (killed); Malone, Flt. Sub-Lt. J. J., D.S.O. (killed).

STAFF.

Becke, Temp. Brig.-Gen. J. H. W., D.S.O., Notts and Derby Regt.

Corballis, Capt. E. R. L., R. Dub. Fus. and R.F.C.

Davidson, Temp. Lt.-Col. E. H., M.C., Gord. Highrs. and R.F.C.

Higgins, Temp. Brig.-Gen. J. F. A., D.S.O., R.A.

Longcroft, Temp. Brig.-Gen. C. A. H., Welsh Regt.

MacInnes, Bt. Lt.-Col. (actg. Lt.-Col.) D. S., C.M.G., D.S.O., Shephard, Bt. Maj. (temp. Brig.-Gen.) G. S., D.S.O., M.C., R. Fus.

Trenchard, Maj.-Gen. H. M., C.B., D.S.O.

Webb-Bowen, Bt. Lt.-Col. (temp. Brig.-Gen.) T. J., Bedf. R.

ROYAL FLYING CORPS.

Adams, Temp. Maj. A. B., Spec. Res.; Allcock, Temp. Capt. W. T. L., Spec. Res. (killed); Andrews, Temp. Capt. J. O., D.S.O., M.C., R. Scots.

Baldwin, Temp. Maj. J. E. A., Hrs.; Barber, Temp. Capt. B. K. B., North'd. Fus.; Barlow, Temp. Sec. Lt. J. L., Gen. List (killed); Barnaby, Temp. Capt. H. O., R.F.A.; Barton, Capt. R. J. F., R. Sc. Fus.; Beale, Temp. Capt. C. O. B., D.S.O., Gen. List; Bettington, Temp. Capt. E. M., Gen. List; Bird, Temp. Capt. A. W., D.S.O., Gen. List; Birley, Temp. Maj. J. L., M.B., R.A.M.C.; Bishop, Temp. Maj. W. A., V.C., D.S.O., M.C., Can. Cav.; Blomfield, Temp. Maj. R. G., Yeo. (Sec. Lt., D. Gds.); Blount, Temp. Maj. C. H. B., M.C., R.W. Surr. R.; Boustead, Lt. H. A. R., Middx. R. (died of wounds); Bruce-Clarke, Capt. W. R., Lond. R.; Bryant, Temp. Maj. C. E., D.S.O., Hrs.; Burnett, Lt. T. L. F., Spec. Res.; Byng, Temp. Lt.-Col. Hon. A. S., Gen. List.

Campbell, Temp. Maj. W. C., D.S.O., M.C., Spec. Res.; Carthew, Temp. Lt.-Col. T. W. C., D.S.O., Gen. List; Charles, Temp. Lt. H. N., Gen. List; Christie, Temp. Lt.-Col. A., R.A.; Cleghorn, Temp. Capt. D. B., Gen. List; Collier, Temp. Lt.-Col. R. H., Spec. Res.; Coningham, Temp. Capt. A., D.S.O., M.C., Spec. Res.; Crang, Sec. Lt. J. G., Spec. Res.

D'Arcy, Sec. Lt. S. H. A., D.S.O., Spec. Res.; Dashwood, Capt. S. L., R.E.; Dixon, Temp. Capt. F. C., Dorset R.; Dore, Maj. A. S. W., Worc. R.; Down, Lt. C. M., Herts R.; Dunlop, Temp. Capt. C., Sea. Highrs.

Freeman, Temp. Lt.-Col. W. R., D.S.O., M.C., Manch. R.; Fullard, Temp. Capt. P. F., D.S.O., M.C., Gen. List.

Gordon, Capt. C. F., M.C., N. Staff. R.; Gordon, Temp. Lt. T. G., Gen. List; Gossage, Temp. Maj. E. L., M.C., R.F.A.; Gouldstone, Temp. Lt. W. H., Gen. List; Graham, Lt. E., Spec. Res.; Greenwell, Lt. R. A., R.F.A.; Grenfell, Temp. Maj. G. P., Spec. Res.

Harding, Temp. Lt. S. A., Spec. Res. (died of wounds); Hearson, Temp. Lt.-Col. J. G., D.S.O., R.E.; Heath, Temp. Lt. R. E., Welsh R.; Henderson, Temp. Maj. G. L. P., M.C., Spec. Res.; Higman, Temp. Capt. H. P. L., R.E.; Holliday, Temp. Capt. F. P., D.S.O., M.C.; Holt, Temp. Lt.-Col. F. V., D.S.O., Oxf. and Bucks. L.I.; Hope, Capt. A. H. C., Sea. Highrs.; Hunter, Temp. Maj. H. J. F., M.C., Rif. Brig.

Jenkins, Maj. L., M.C., R.G.A.; Jupp, Temp. Capt. W. D. L., Spec. Res.

Kemper, Temp. Capt. J., S. Lan. R.; Kennedy-Cochran-Patrick, Temp. Maj. W. J. C., D.S.O., M.C., Rif. Brig.; Kinnear, Temp. Maj. J. L., M.C., L'pool. R.

Learmount, Temp. Maj. L. W., D.S.O., M.C., Spec. Res.; Leech, Temp. Sec. Lt. W. F., D.S.O. (died of wounds); Leighton, Temp. Maj. J. B. T., M.C., S. Gds. (died of wounds); Levick, Temp. Maj. A.; Lowcock, Temp. Capt. R. J., D.S.O., M.C., Notts and Derby R.; Ludlow-Hewitt, Temp. Lt.-Col. E. R., M.C., R. Ir. Rif.

Maddock, Temp. Sec. Lt. J. W., Gen. List; Mansfield, Temp. Lt.-Col. W. H. C., D.S.O., Shrop. L.I.; Marson, Lt. T. B., Yeo.; Martyn, Capt. C. G., Mon. R.; M'Coy, Temp. Capt. R. P. J., Spec. Res.; Middlemas, Temp. Capt. P., Gen. List; Mitchell, Temp. Maj. G. A. N., R. Fus.; Mitchell, Temp. Lt.-Col. W. G. S., M.C., High. L.I.; Morris, Temp. Maj. A. S., Gen. List.

Newall, Temp. Lt.-Col. C. L. N., Ind. Army.

Palmer, Temp. Capt. E. B., A.S.C.; Patten, Temp. Lt. J. McD., Spec. Res. (killed); Pither, Temp. Capt. S. E., K.O. Sco. Bord.; Portal, Temp. Maj. C. F. A., D.S.O., M.C., R.E., Spec. Res.; Powell, Temp. Capt. E., Spec. Res.; Pretyman, Temp. Lt.-Col. G. F., D.S.O., Somerset L.I.; Probyn, Temp. Capt. H. M., D.S.O., R. War. R.; Pullan, Temp. Lt. J. A., Durh. L.I., Spec Res.

Rawson, Temp. Sec. Lt. A. H. C. A., R. War. R.; Rhys-Davids, Lt. A. P. F., D.S.O., M.C., Spec. Res.; Robertson, Temp. Maj. T. E., Spec. Res.; Roxby, Temp. Maj. F. M., N. Staffs. R.

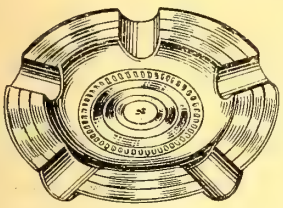
Scott-Davidson, Temp. Lt. W. W., Gen. List; Sharp, Temp. Capt. C. C., Gen. List; Sharples, Temp. Sec. Lt. N., Manch. R.; Shepherd, Temp. Capt. A. S., D.S.O., M.C., Spec. Res. (Sec. Lt. C'wealth. Mil. Forces); Shepherd, Temp. Lt. C. K., Gen.

THE SPECIAL NAVAL AND MILITARY ISSUES.

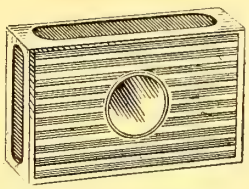
As usual, the Special Naval and Military Issues of "The Aeroplane" will be published at the beginning of the New Year, the Naval Issue on Jan. 2nd and the Military Issue on Jan. 9th. They will contain a Review of the Year 1917, the Honours Lists of the Flying Services, and special articles and illustrations dealing with Service matters. Owing to restrictions on the paper supply, the number printed has to be strictly limited, so readers will find it advisable to place their orders well in advance, either through their newsagents or direct with the Publishers, The Wm. Dawson Publishing Co., Ltd., 2, Breams Buildings, E.C.4. The price will be 3d. as usual, or 4d., post free.

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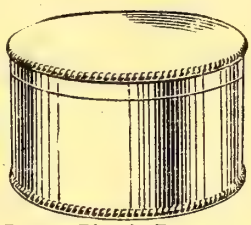
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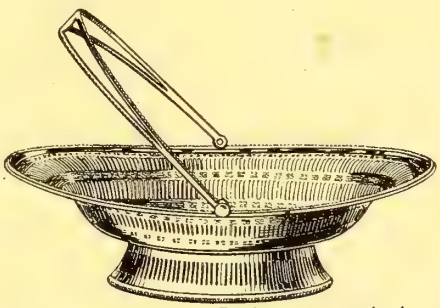
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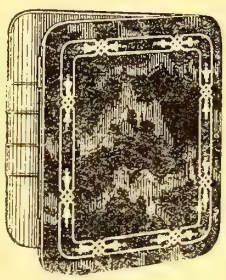
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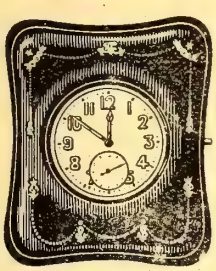
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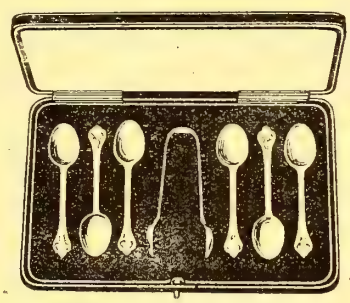
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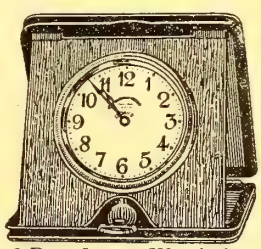
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Walser, Temp. Maj. A. A., M.C., Lond. R.; Warman, Temp. Sec. Lt. C. T., D. S. O., M.C., Gen. List; Wilkinson, Temp. Maj. A. M., D.S.O., Hamps. R.; Woodhouse, Capt. J. W., D.S.O., M.C., Spec. Res.; Wynne-Eyton, Temp. Maj. C. S., Gen. List.

War Office, Dec. 12th.

REGULAR FORCES.—Staff.—The following temp. appt. is made at the War Office.—Dep. Asst. Dir.—Lt. (temp. Capt.) L. W. W. Lees, R.G.A. Spec. Res., from an Equipment Officer, 1st Cl., and to retain his temp. rank whilst so empld., vice Sec. Lt. G. W. A. Brown, R.F.C., Spec. Res., Oct. 23rd.

Establishments.—R.F.C.—Mil. Wing.—Gen. List.—Serjt. H. G. D. MacF. Payne, from R.F.C., to be temp. Sec. Lt., Nov. 18th.

Memoranda.—The undermentioned Serjts., from R.F.C., to be Sec. Lts. whilst serving with R.F.C.: Charles William Attwood. Nov. 14th, 1917., Christmas Evans, Nov. 18th, 1917.

* * *

The King has been pleased to award the Distinguished Conduct Medal to the following N.C.O. for gallantry and distinguished service in the Field:—

445 Flt. Serjt. H. Campbell, R.F.C. (Auckland, N. Zealand).

* * *

The King has been pleased to approve of the award of the Military Medal for bravery in the Field to the following N.C.O. and men:—

958 Serjt. G. W. Eddington, R.F.C. (Tottenham).
8857 1st Cl. Air Mech. C. W. Cosgrove, R.F.C. (New Southgate).
49338 2nd Cl. Air Mech. T. H. Lea, R.F.C. (Wilmslow).
94425 2nd Cl. Air Mech. S. L. Leyland, R.F.C. (Wallasey).
94039 2nd Cl. Air Mech. S. Moreman, R.F.C.. Late Som. L.I. (Plymouth).
87808 Cpl. T. Triese, R.F.C. (Heywood).
94042 2nd Cl. Air Mech. (Actg. Cpl.) A. Walters, R.F.C. ([E.] Birmingham).

War Office, Dec. 13th.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing.—Flt. Comdrs.—Capt. J. L. Head, Lond. R., T.F., from a Flying Officer, Nov. 23rd. From Flying Officers, and to be temp. Capts. while so empld.:—Temp. Sec. Lt J. H. Tudhope, Gen. List, Nov. 18th. Temp. Sec. Lt. L. I. Barker, Gen. List, Nov. 21st. Temp. Sec. Lt. G. E. Thomson, attd. K.O. Sco. Bord., and to be transfd. to R.F.C., Gen. List, Nov. 23rd. Temp. Sec. Lt. A. L. Messenger, Gen. List, Nov. 24th. Lt. M. W. Turner, R.G.A., T.F., Nov. 28th.

Special Appointment.—Graded as a Flt. Comdr.—Capt. A. M. Van der Byl, H.A.C., T.F., a Balloon Comdr., Nov. 1st.

Flying Officer (Obsr.).—Capt. W. H. L. O'Neill, Ind. Inf., from an Adjt., Oct. 2nd, seny., May 20th.

Balloon Co. Comdrs.—(Graded as Flt. Comdrs.).—Capt. F. J. F. Lee, R. Mun. Fus., from a Balloon Comdr. (graded as a Balloon Officer), Nov. 22nd. From Balloon Officers, and to be temp. Capt. whilst so empld.:—Lt. C. H. Gimingham, Herts R., T.F. (since killed), July 18th. Temp. Lt. H. Throwe, Gen. List, Nov. 10th.

Equipt. Officer, 1st Cl.—Sec. Lt. (temp. Lt.) M. Keegan, R. Dub. Fus., from the 2nd Cl., and to be temp. Capt. whilst so empld., Nov. 22nd, 1917.

Chief Experimental Officers.—(Graded as Park Comdrs.).—From Experimental Officers, 1st Cl. (graded as Equipt. Officers, 1st. Cl.), and to be temp. Majs. whilst so empld.:—Lt. (temp. Capt.) B. M. Jones, R.E., T.F.; Capt. H. R. Raikes, E. Kent R., Spec. Res., Nov. 1st. Temp. Capt. H. T. Tizard, Gen. List, Nov. 4th.

Experimental Officers, 1st Cl.—(Graded as Equipt. Officers, 1st Cl.).—From Experimental Officers, 2nd Cl. (graded as Equipt. Officers, 2nd Cl.).—Sec. Lt. (temp. Lt.) C. E. Fairburn, Spec. Res., and to be temp. Capt. whilst so empld., Oct. 13th. Capt. F. W. Musson, N. Lan. R., T.F. Lt. F. A. Harver, Spec. Res., and to be temp. Capt. whilst so empld., Nov. 1st.

Schools of Instruction.—Central Flying School.—Instr.—Capt. (temp. Maj.) C. M. Crowe, M.C., Spec. Res., a Sqdn. Comdr., vice Lt. (temp. Maj.) R. Balcombe-Brown. M.C., R.F.A., Spec. Res., and to retain his temp. rank whilst so empld., Oct. 26th.

Gen. List.—Lt. H. F. Maybury, Middx. R., T.F., to be temp. Capt. (with pay and allowance as Lt.) whilst holding the appt. of Adjt., May 4th.

War Office, Dec. 14th.

REGULAR FORCES.—Staff.—The following temp. appt. is made at the War Office:—Staff Lt.—Sec. Lt. (temp. Lt.) T. A. Peddell, R.F.C., Spec. Res., from an Equipt. Officer, 2nd Cl., vice Capt. E. S. Skipper, R.F.C., Spec. Res., Nov. 3rd.

Establishments.—R.F.C.—Mil. Wing.—Staff Officer, 1st Cl.—Graded as an A.A.G.—Lt. (temp. Lt.-Col.) M. Spicer, North'n R., from a Depôt Comdr., and to retain his temp. rank while so empld., vice Capt. (temp. Lt.-Col.) C. F. Lee, Yeo., T.F., Nov. 17th.

Sqdn. Comdr.—Capt. W. A. S. Rough, Bedf. R., Spec. Res., from a Flt. Comdr., and to temp. Maj. while so empld., August 24th.

Flt. Comdrs.—From Flying Officers, and to be temp. Capts. while so empld.:—Lt. G. Barrett, Spec. Res.; Sec. Lt. (temp. Lt.) F. D. Holder, M.C., E. Kent R., Oct. 13th.

Balloon Wing Comdr.—Capt. (temp. Maj.) H. M. Meyler, M.C., Bord. R., from a Co. Comdr. (graded as a Sqdn. Comdr.), and to be temp. Lt.-Col. while so empld., Nov. 22nd.

Equipt. Officers, 1st Cl.—From the 2nd Cl.—Temp. Capt. F. R. Williams, Gen. List, July 1st. And to be temp. Capts. while so empld.:—Lt. G. J. Monson-Fitzjohn, Bord. R., T.F., August 1st. Temp. Lt. T. Allen, Gen. List. Sec. Lt. (temp. Lt.) G. E. Quincey, Spec. Res., Sept. 1st. Lt. H. Phillips, Spec. Res., Sept. 22nd. Lt. S. Allenby, Spec. Res., Sept. 26th. Temp. Lt. H. F. Bradley, Gen. List. Temp. Lt. A. B. W. Greenhough, M.C., Gen. List, Nov. 1st.

Memorandum.—1st Cl. Air Mech. R. Kite, from R.F.C., to be temp. Hon. Sec. Lt. whilst specially empld., Dec. 15th.

Oversea Contingents.—Canada.—Alberta R.—Temp. Capt. J. A. Revill is secd. for duty with the R.F.C., Aug. 7th. Substd. for "Gazette" notfn., Oct. 18th, incorrectly specifying date as Sept. 6th.

Western Ontario R.—Temp. Lt. C. E. B. Corbould to be temp. Capt., and to remain secd. with R.F.C., April 9th.

Can. M.C.—Temp. Qrmr. and Hon. Capt. G. K. Lucas resigns his commn. on transfer to the R.N.A.S., Dec. 1st.

* * *

The King has been pleased to award the Albert Medal in Gold to Nicholas Rath, seaman, R.N.R., and the Albert Medal to Richard Knoulton, ordinary seaman, R.N., and George Faucett Pitts Abbott, deckhand, R.N.R., trawler section, in recognition of their gallantry in saving life in the following circumstances:—On Sept. 14th, 1917, a seaplane came into collision with one of the masts of a shore wireless station, and remained wedged in it, the pilot (Actg. Flt. Comdr. E. A. de Ville) being rendered unconscious, and thrown out of his seat onto one of the wings.

The three men above mentioned at once climbed up the mast for 100 feet, when Rath, making use of the boatswain's chair, which moves on the inside of the mast, was hoisted up by men at the foot of the mast to the place, over 300 feet from the ground, where the seaplane was fixed. He then climbed out on the plane, and held the pilot until the arrival of Knoulton and Abbott, who passed the masthead gantline out to him.

Having secured the pilot with the gantline Rath, with the assistance of Knoulton and Abbott, lifted him from the plane to the inside of the mast, and lowered him to the ground.

The three men were very well aware of the damaged and insecure condition of the mast, which was bent to an angle where the seaplane had become wedged. One of the three supports of the mast was fractured, and, so far as the men knew, the mast or seaplane might at any time have collapsed.

War Office, Dec. 15th.

REGULAR FORCES. — Establishments. — R.F.C.—Mil. Wing.—Special Appt.—Graded as a Sqdn. Comdr.—Capt. R. W. Bruce, Canadian Local Forces, from a Co. Comdr. (graded as a Flt. Comdr.), and to be temp. Maj. whilst so empld., Nov. 1st.

Adjts.—Capt. D. C. L. Speed, K.R. Rif. C., from a Balloon Co. Comdr. (graded as a Flt. Comdr.), Nov. 1st. Capt. H. R. Kavanagh, R. Ir. Fus., and to be secd., Nov. 26th. And to be temp. Capts. (without pay or allowances of that rank) whilst so empld.:—Sec. Lt. (temp. Lt.) E. Page, Middx. R., from a Flying Officer, Oct. 21st. Temp. Lt. W. G. Perkins, R. Fus., and to be transfd. to R.F.C. Gen. List, vice Lt. (temp. Capt.) E. Duveen, Spec. Res., Oct. 30th. Sec. Lt. (temp. Lt.) W. E. G. Bryant, R. Fus., from a Flying Officer (Observer), Nov. 1st. Lt. W. Mcl. Watt, R. Highrs., T.F. Temp. Sec. Lt. G. A. Sinclair-Hill, Gen. List, from a Balloon Officer, Nov. 26th.

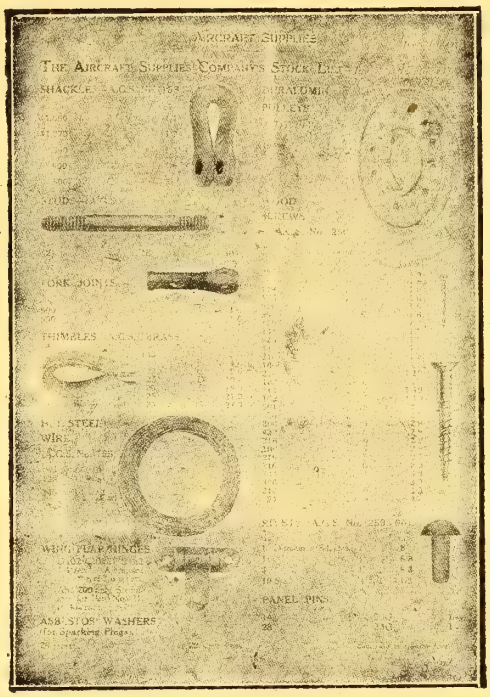
Depôt Comdr.—Capt. (temp. Maj.) H. Lee, Spec. Res., from a Park Comdr, and to be temp. Lt.-Col. whilst so empld., Nov. 17th.

Park Comdrs.—From Equipt. Officers, 1st Cl. and to be temp. Majs. whilst so empld.:—Capt. A. M. C. Scott, Lond. R., T.F., Oct. 25th. Lt. (temp. Capt.) L. Findlater, M.C., Manch. R., Spec. Res., Nov. 1st. Lt. (temp. Capt.) T. W. Winter, Spec. Res., Nov. 20th.

Equipt. Officers, 1st Cl.—From the 2nd Cl., and to be temp. Capts. whilst so empld:—Temp. Lt. A. Chapman, Gen. List. Nov. 16th. Temp. Lt. H. Fernihough, Gen. List, Nov. 23rd.

(Continued on page 1848.)





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Back numbers containing these articles are still available, and will be sent on application. Vol. 1 and Vol. 2 also contained the following articles:—"Raw Material, Stores and Arrangements"; "On Chasing Orders"; "On the Heat Treatment of Steel"; "On Controlling Stationery and Office Supplies"; "On Prime Costs"; "Terms used in Steel Testing"; "On System in the Payment of Wages"; "On the Manufacture of A.G.S. Bolts and Nuts" (with special chart).

These issues are now out of print, but we are proposing to reprint these articles in book form very shortly.

The first issue of the new Volume (Vol. 3) will appear on Thursday, Jan. 3rd, and will include an interesting article on "The Use of Charts and Tables in the Aircraft Industry," by G. H. Mansfield, and will contain, as usual, complete Illustrated Stock List, Current Prices, details of new items, Enquiry Bureau, and other information of interest to Aircraft Manufacturers.

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Volume 2. No. 14, published on December 20th next, completes Volume 2 and will include the second portion of Mr. J. T. Morton's interesting and instructive Article on "The Rigging of Aircraft."

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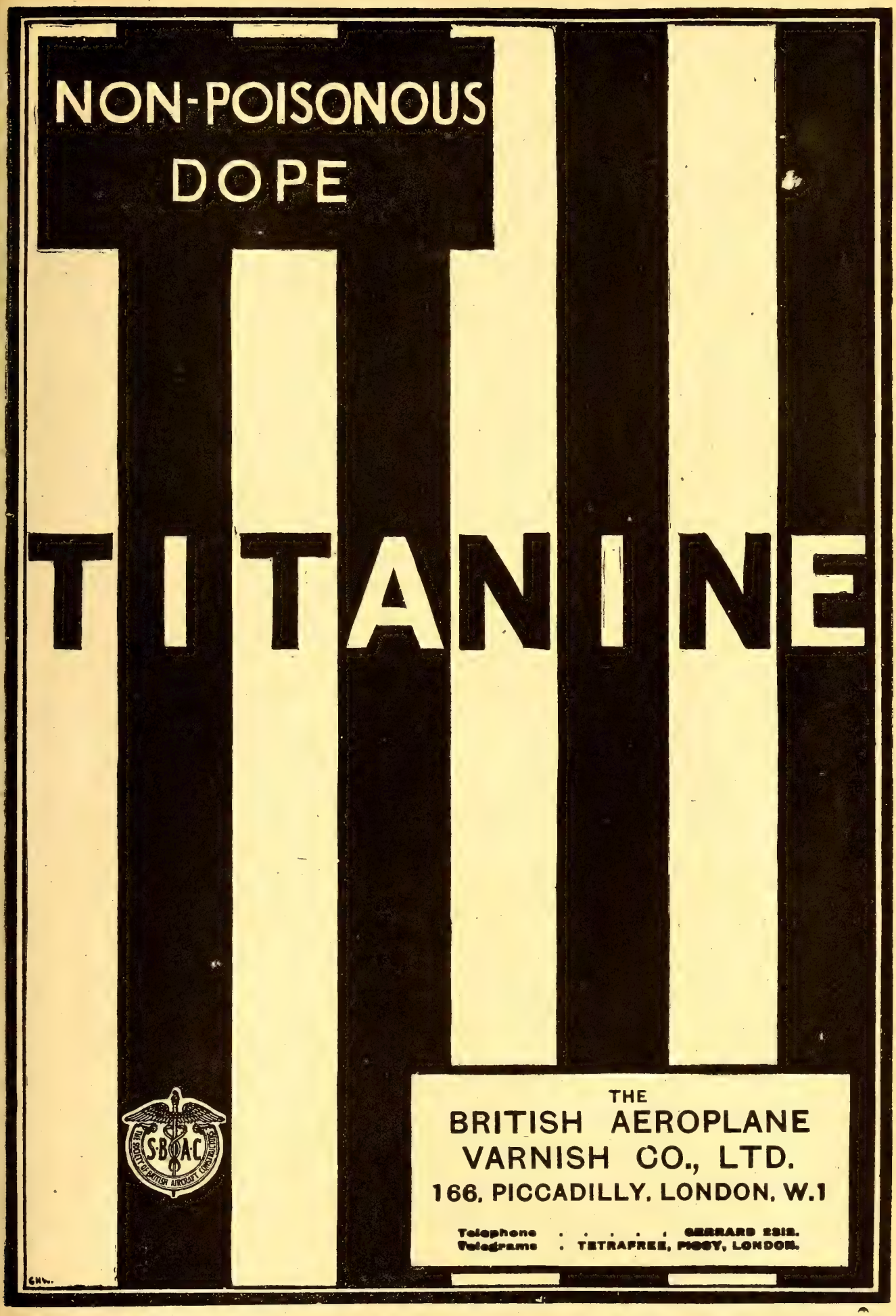
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The 230 h.p. Benz Engine.

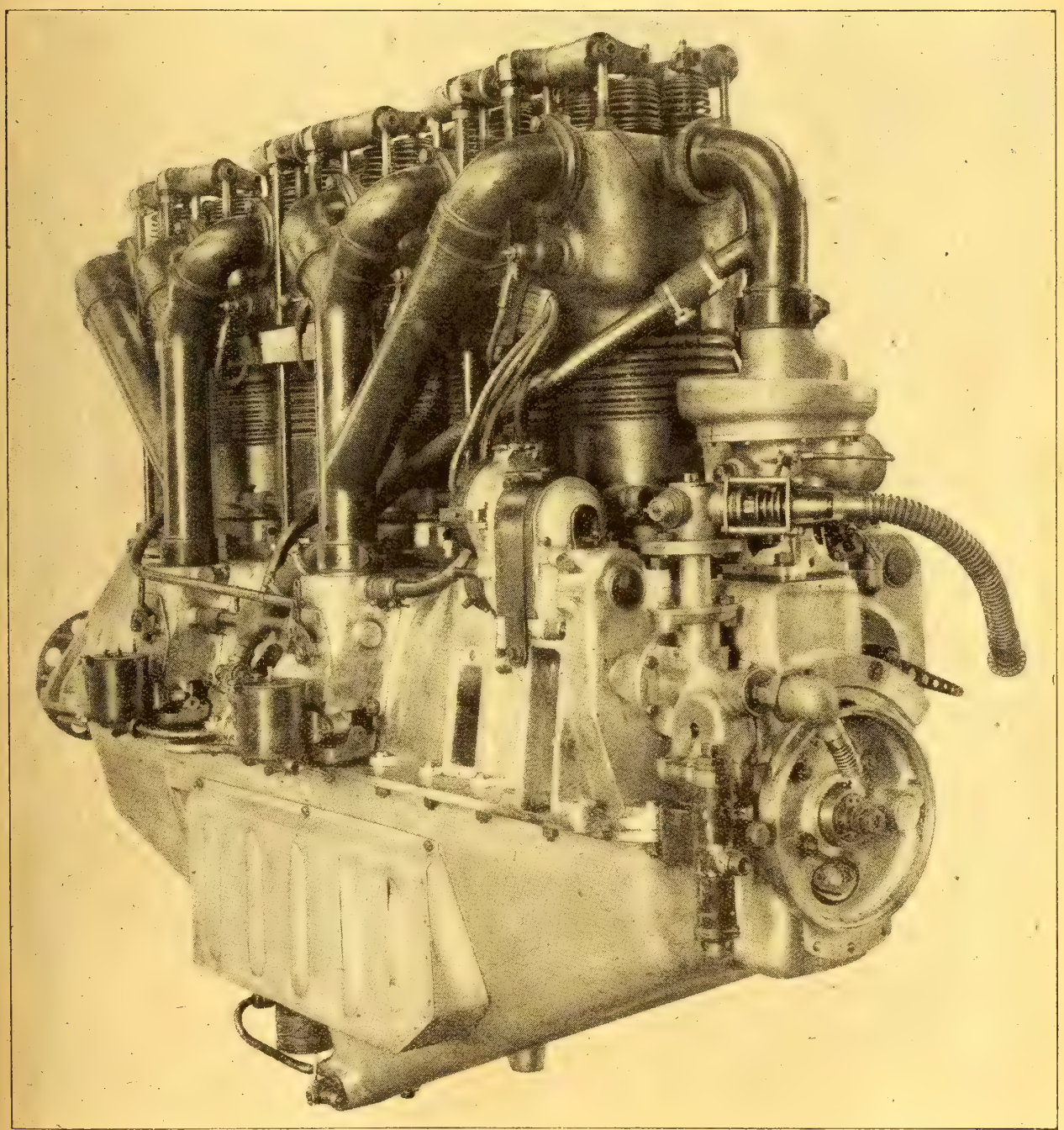


Fig. 1.—Part End View of the 230 h.p. Benz Engine, showing Petrol and Water Pump.

[The following particulars of the Benz Engine, together with photographs and drawings, have been kindly supplied by the Technical Department of the Air Board, to whom the Editor desires to express his thanks.]

The following detailed description of the 230-h.p. Benz engines is based on an investigation and tests of the engine (No. 30127) taken from the German Aviatik biplane G.40, captured on May 20th, 1917, and includes a report on the power and consumption tests carried out at the Royal Aircraft Factory, together with chemical analyses of the principal parts of the engine.

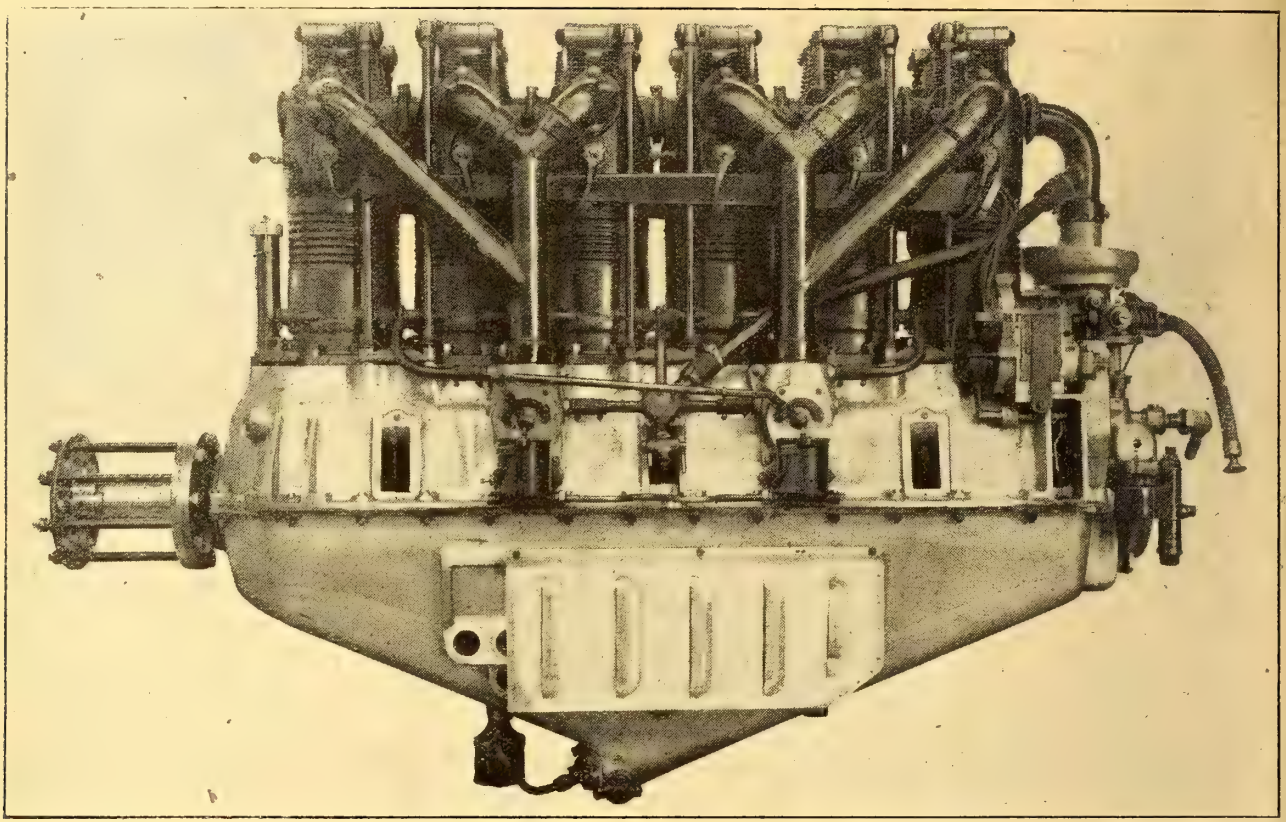


Fig. 2.—Inlet Side of the 230 h.p. Benz Engine.—145 mm. Bore × 190 mm. Stroke.

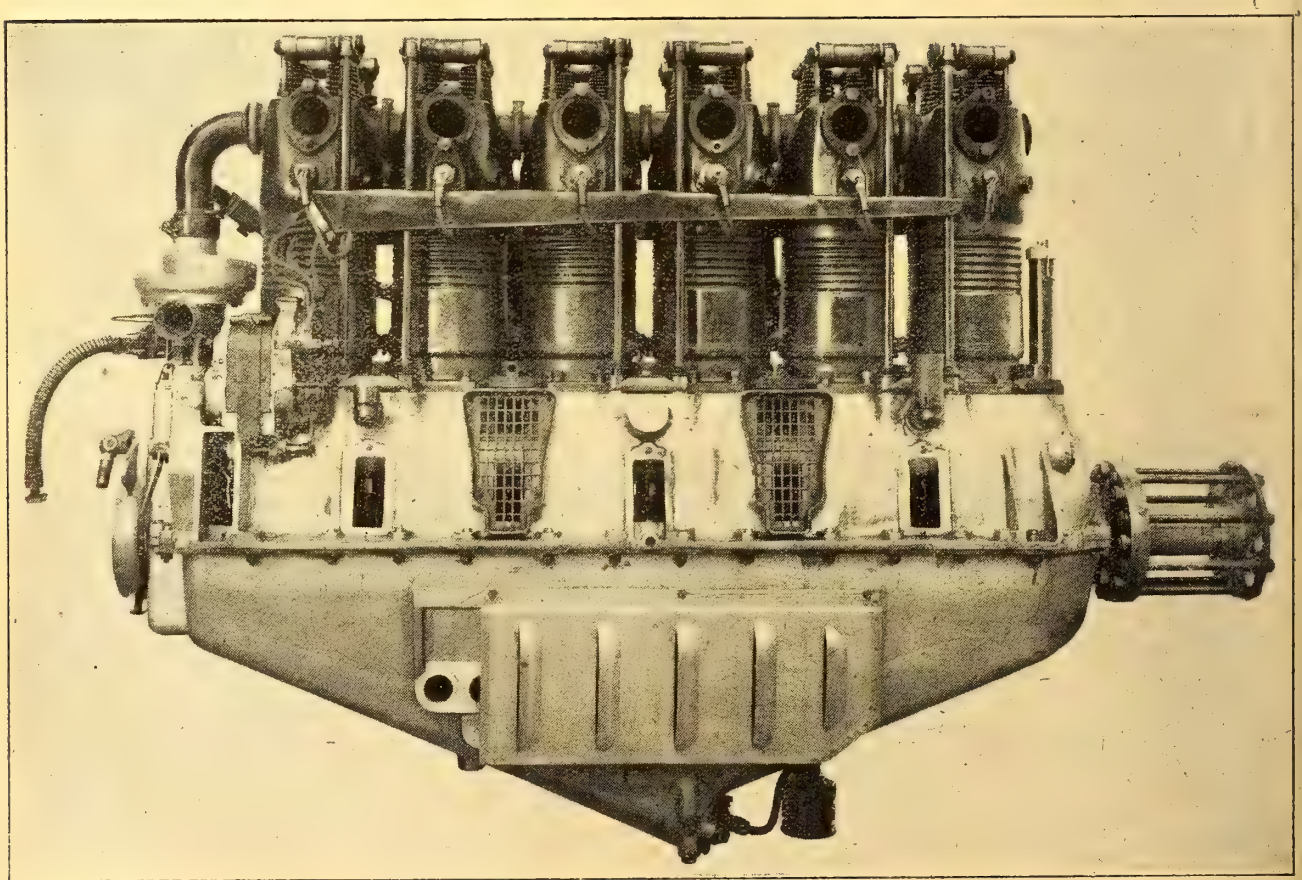


Fig. 3.—Exhaust Side of the 230 h.p. Benz Engine.

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LEADING FEATURES OF THE ENGINE.

Following the usual German aero-engine practice, the 230-h.p. Benz is of the six-cylinder vertical water-cooled type. Each separate cylinder is bolted to the crankcase by long studs, which pass through the crank-chamber top half and secure the crankshaft bearings between the top and bottom halves of the crank-chamber.

Two inlet and two exhaust valves are fitted in the head of each cylinder. The valves are operated by overhead valve rockers working on ball bearings and by push rods on either side of the cylinders. The two camshafts, which run on plain bearings, are neatly arranged inside the top half of the crankcase, and the floating exhaust camshaft is provided with half compression cams.

The pistons are of cast-iron, fitted with three exceptionally wide rings, and the piston heads, following usual Benz practice, are supported by conical steel forgings riveted and welded to the piston crown, which bear on the centre portion of the gudgeon pins, through slots cut in the connecting rod small ends.

As in the 160-h.p. Benz engines, two separate two-jet carburettors are fitted, each having their air intake passages through the top half of the crankcase casting. Each carburettor supplies

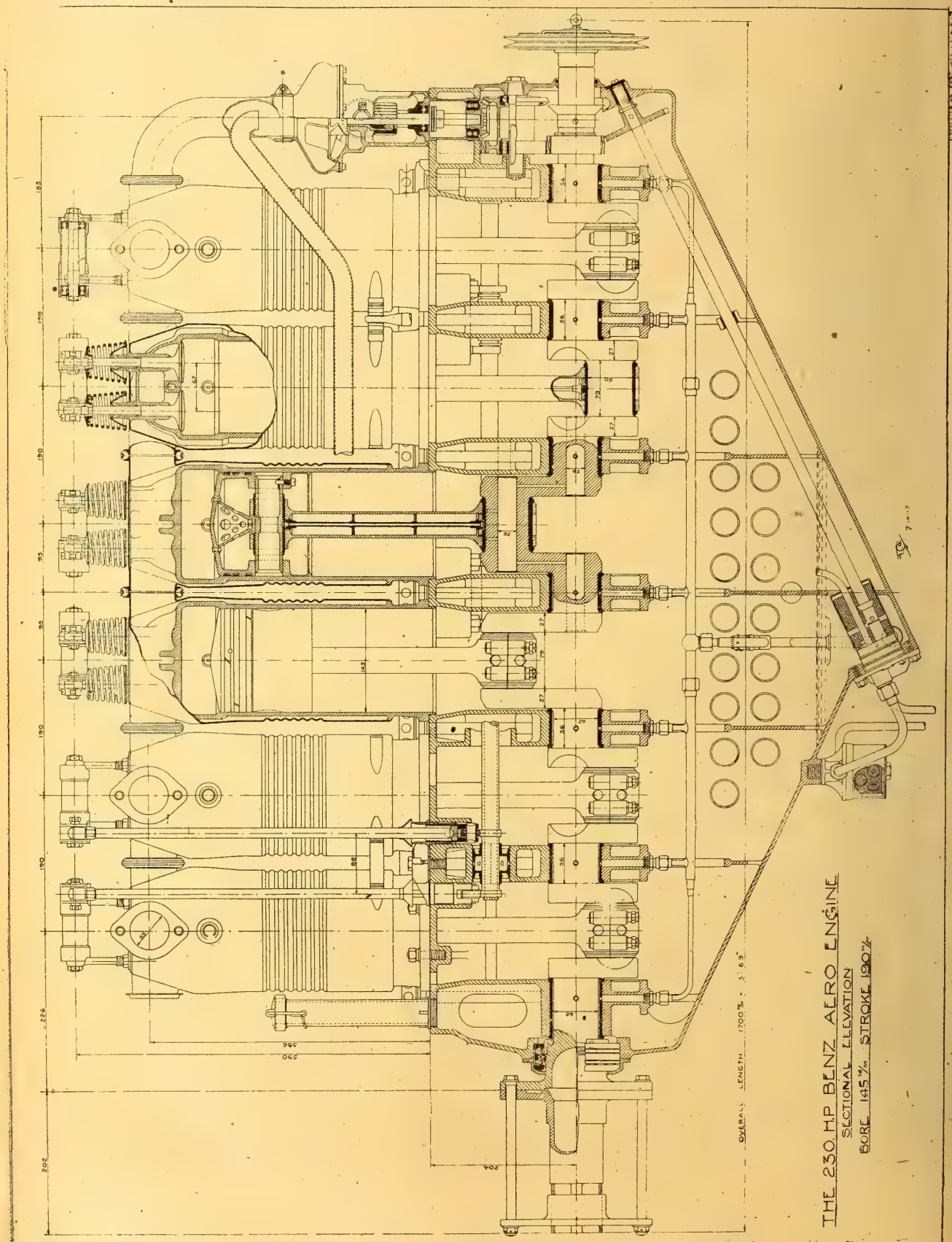


Fig. 4.—Sectional General Arrangement.


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three cylinders through an independent branched induction pipe, built up of light aluminium tube.

The lubrication of the crankshaft and connecting rod bearings is effected by a very neatly designed gear pump working in an auxiliary oil reservoir formed in the bottom of the air-cooled base chamber.

An oil-sealed petrol pump of interesting design supplies petrol to the carburettors in conjunction with a supplementary pressure reservoir enclosed in the main petrol tank. The petrol pump is driven off the rear end of the inlet camshaft. The same driving spindle also operates the machine-gun interrupter gear and the tachometer drive.

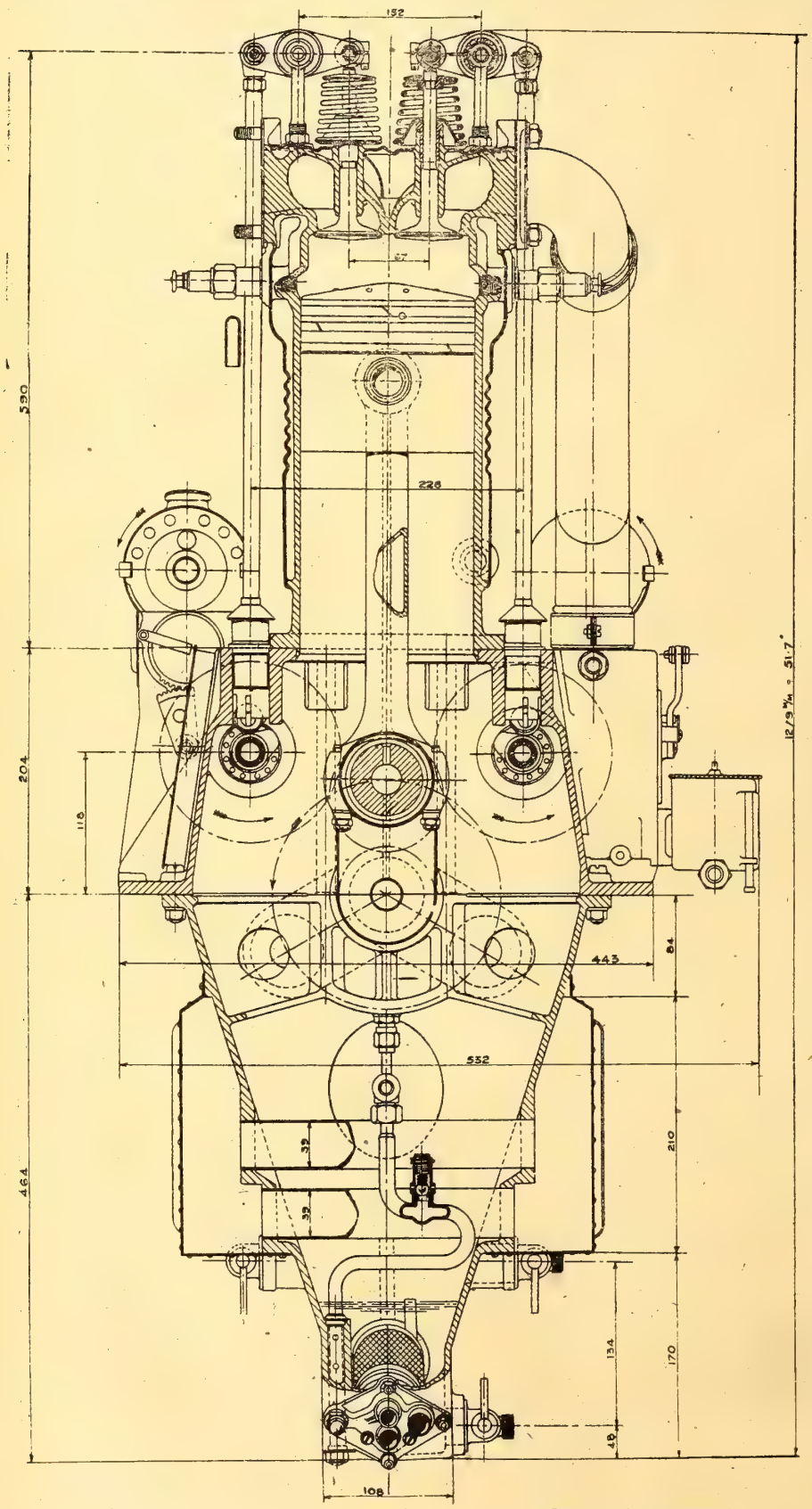


Fig. 5.—Cross Section. General Arrangement.

CONSTRUCTIONAL DETAILS.

Cylinders.—Except for the steel water jackets, the cylinders are made entirely of cast-iron. The water-jacketed heads, including the twin inlet and exhaust valve passages, are cast integral with the cylinder castings.

The bore of the cylinders is 145 mm. and the thickness of the cylinder walls tapers from 5.5 mm. at the base flanges to 6.5 mm. at the top of the cylinder barrels. The water jackets are of die-pressed sheet steel, built up from half sections and welded both at the vertical joints and at the bottom of the water jackets to flanges machined on the outside of the cylinder barrels. The water jackets are exceptionally long, extending to within 45 millimetres of the cylinder base flanges. Seven annular corrugations are formed in the water jackets to allow for expansion, and three transversely in the sheet steel crown of the water jackets. The general construction of the cylinders and water jackets with their water connections is clearly shown in the photographic views of the cylinders and in the sectional drawings. Figs. 4 and 5.

The water spaces formed in the cylinder-heads and the cooling of the valve pockets are well carried out. Dished plates are welded in position in the water space above the crown of each cylinder to deflect the flow of water onto the exhaust valve pockets. The diameter of the cylinder-head water connections is 60 mm.

The cylinder registers extend 10 mm. below the base flanges into the crank-chamber, and are held down by four 12-mm. studs, and also by dogs at four points. The dogs are secured by long studs which pass through the top half of the crank-chamber and are screwed into the bottom halves of the main bearing housings, which are cast integral with the bottom half of the base chamber. The parts of the holding-down studs which screw into the aluminium are of larger diameter and of coarser pitch. The nuts which secure the cylinder holding-down clamps are of interesting design, being of circular cupped formation and drilled radially with four 12-mm. holes for screwing up with a "Tommy Bar."

The total weight of each cylinder complete with valves, valve springs and valve rocker-supports = 44.25 lbs.

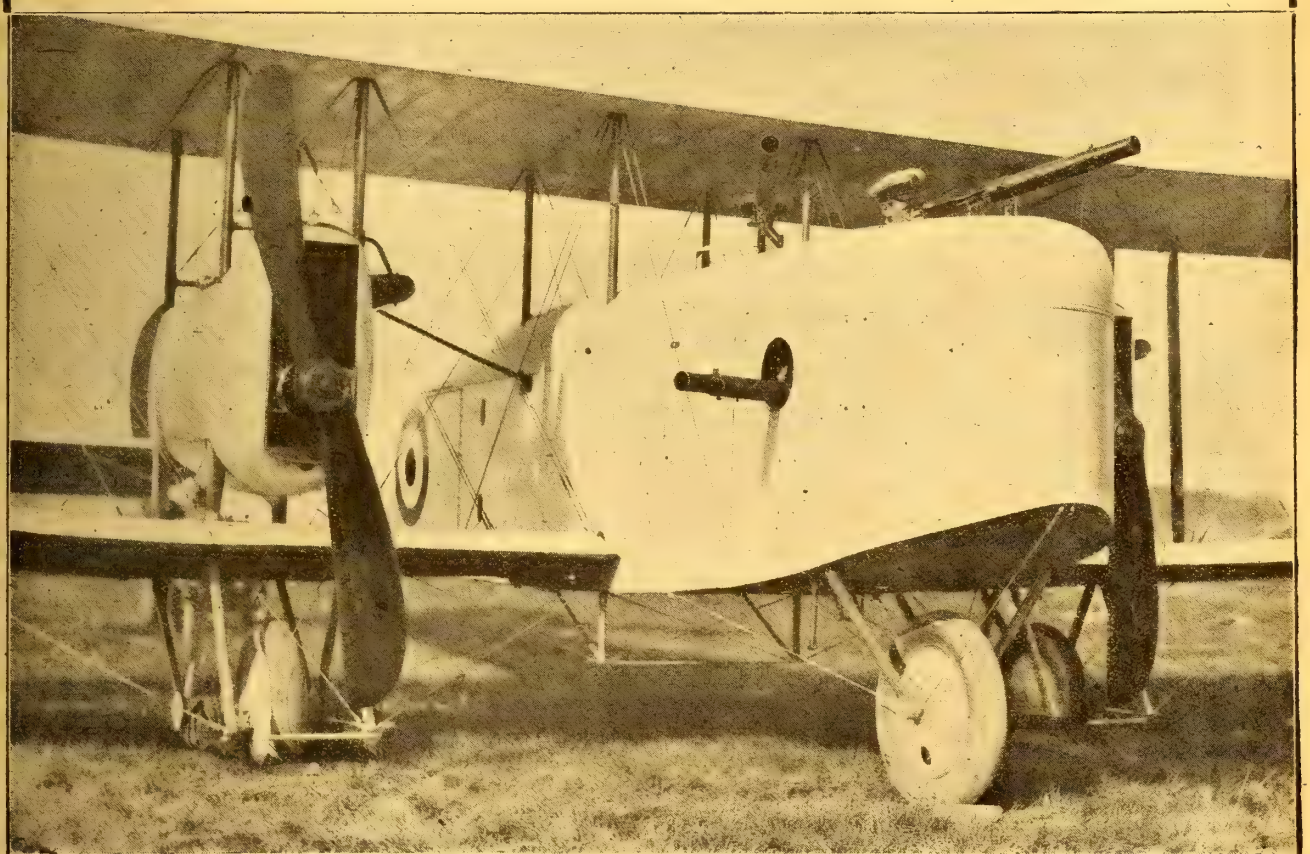
Pistons.—The pistons, with the exception of the small conical pillars, are made entirely of cast-iron, and weigh 7.62 lbs. each, complete with rings and gudgeon pin.

Three rings are provided above the gudgeon pin, the lower one being a scraper ring. The width of each ring is 8 mm. and the width of gap in cylinder = 0.45 mm. The space between the two top rings is 4.25 mm., whilst the scraper ring is 10 mm. below the middle ring; 4-mm. pegs are provided to locate the radial position of each ring, and six 2-mm. holes are drilled in the piston below the scraper ring.

The slightly domed head of each piston is supported by a hollow conical pillar, which is machined from a steel forging and is riveted onto the under side of the piston, as shown in the sectional drawing of the piston, Fig. 8. The lower end of the conical pillar, which is machined at the same time as the holes in the gudgeon-pin bosses are bored, bears on the centre part of the gudgeon-pin, and to allow for this the centre portion of the top of the connecting rod small end and gudgeon-pin bush is cut away. By this construction the greater part of the force of the explosion is transmitted from the head of the piston directly to the connecting rod.

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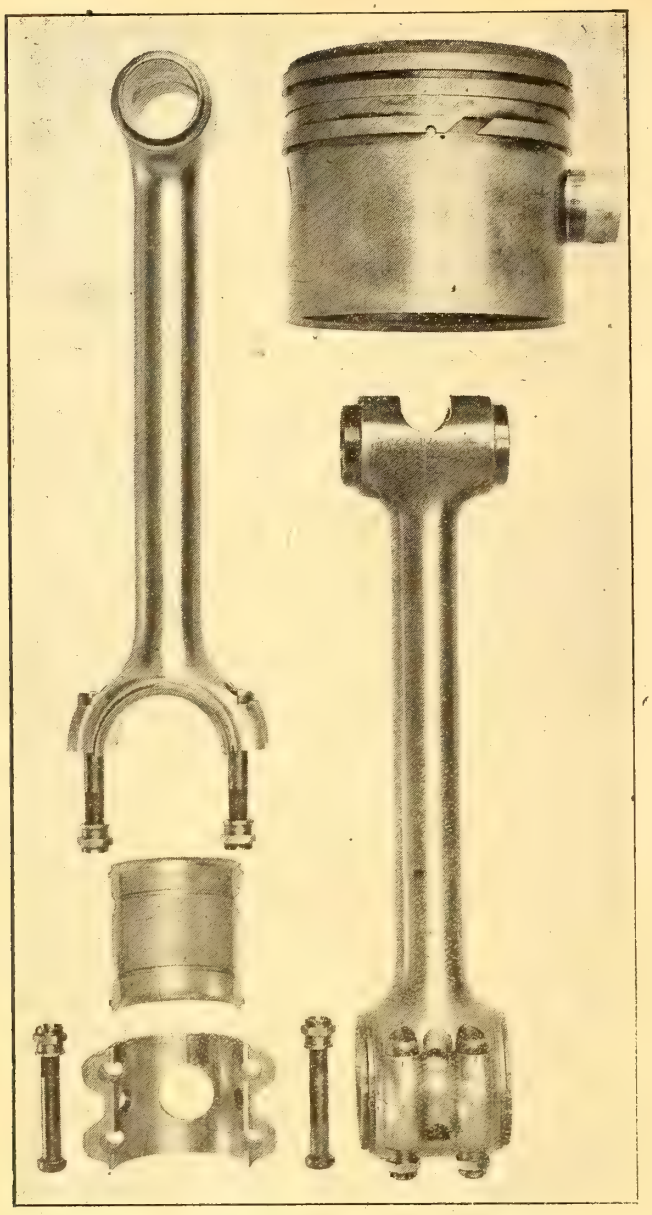


Fig. 6.—Views of Piston and Connecting Rod.

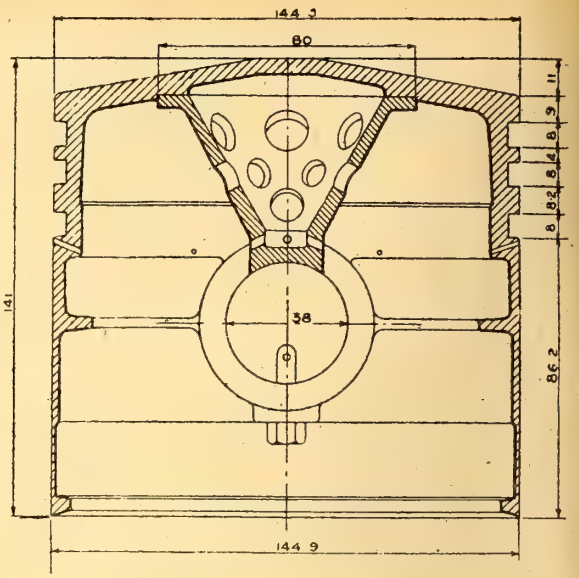
The gudgeon pins are 38 mm. diameter and are bored 30 mm. inside diameter. The centre portion of the gudgeon pin is 25 mm. bore for a length of 20 mm., where the conical piston head support bears on the centre of the gudgeon pin. The piston ring side clearance = 0.004 in. The diameter at the top of the piston = 144.15 mm. The diameter at the bottom of the piston = 144.67 mm.

Connecting Rods.—The very clean design of the tubular connecting rods is apparent in the photographic views, and the details of their construction are clearly shown in the sectional drawing (Fig. 9).

The whole of the connecting rod, including the lugs for the four bolts securing the halves of the big end, is machined all over from a steel forging. The outside diameter of the tubular rod is 36 mm. and the inside is bored with a 30 mm. hole from the crank-pin end to within 6 mm. of the gudgeon-pin bush—the bottom end of the bore being fitted with a screwed plug.

A 6 mm. steel pipe, for lubricating the gudgeon pin, is fixed inside the centre of the connecting rod and the pipe is supported in the centre by two flanged discs, as shown in the drawing. The weight of the big end is lightened by four 12-mm. holes and one 30-mm. hole drilled radially through the big end. Two semi-circular oil grooves are machined in the white metal of the big end bearing caps and one lateral groove is cut in the top portion of the big end bearing. The total weight of the complete connecting rod is 7 lbs. 1 oz.; the big end weighing 4 lbs. 12 ozs., and the small end 2 lbs. 5 ozs.

Total big end side clearance = 0.15 mm. and the float of the small end bush between the gudgeon-pin bosses = 14 mm.



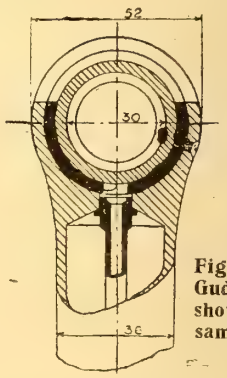
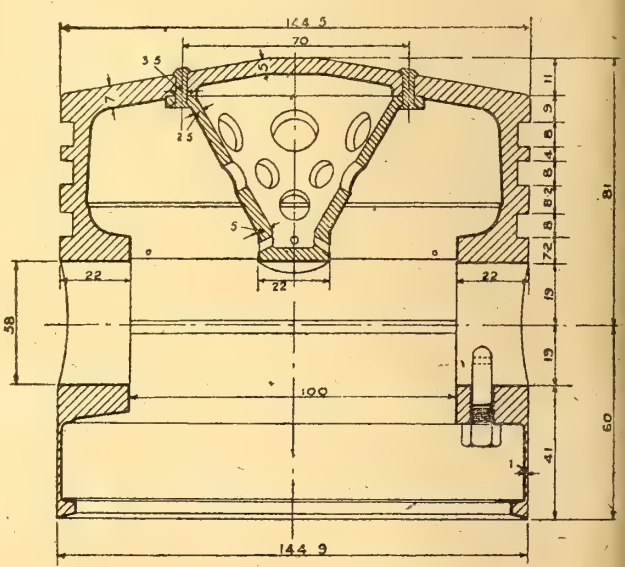


Fig. 7.—End View of Gudgeon, with Piston shown in section in same aspect.



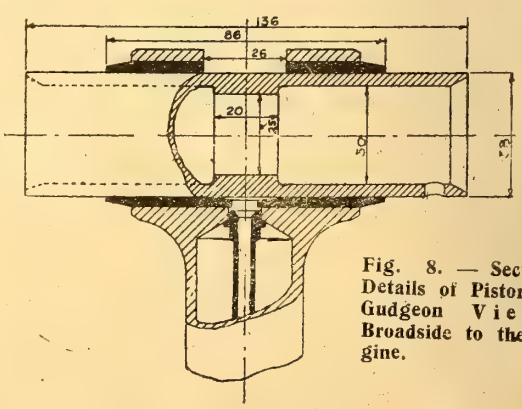


Fig. 8. — Sectional Details of Piston and Gudgeon Viewed Broadside to the Engine.

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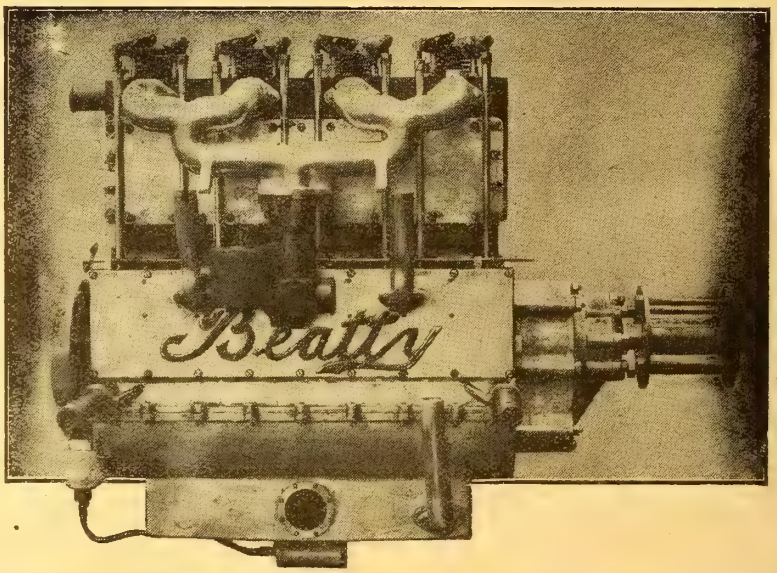
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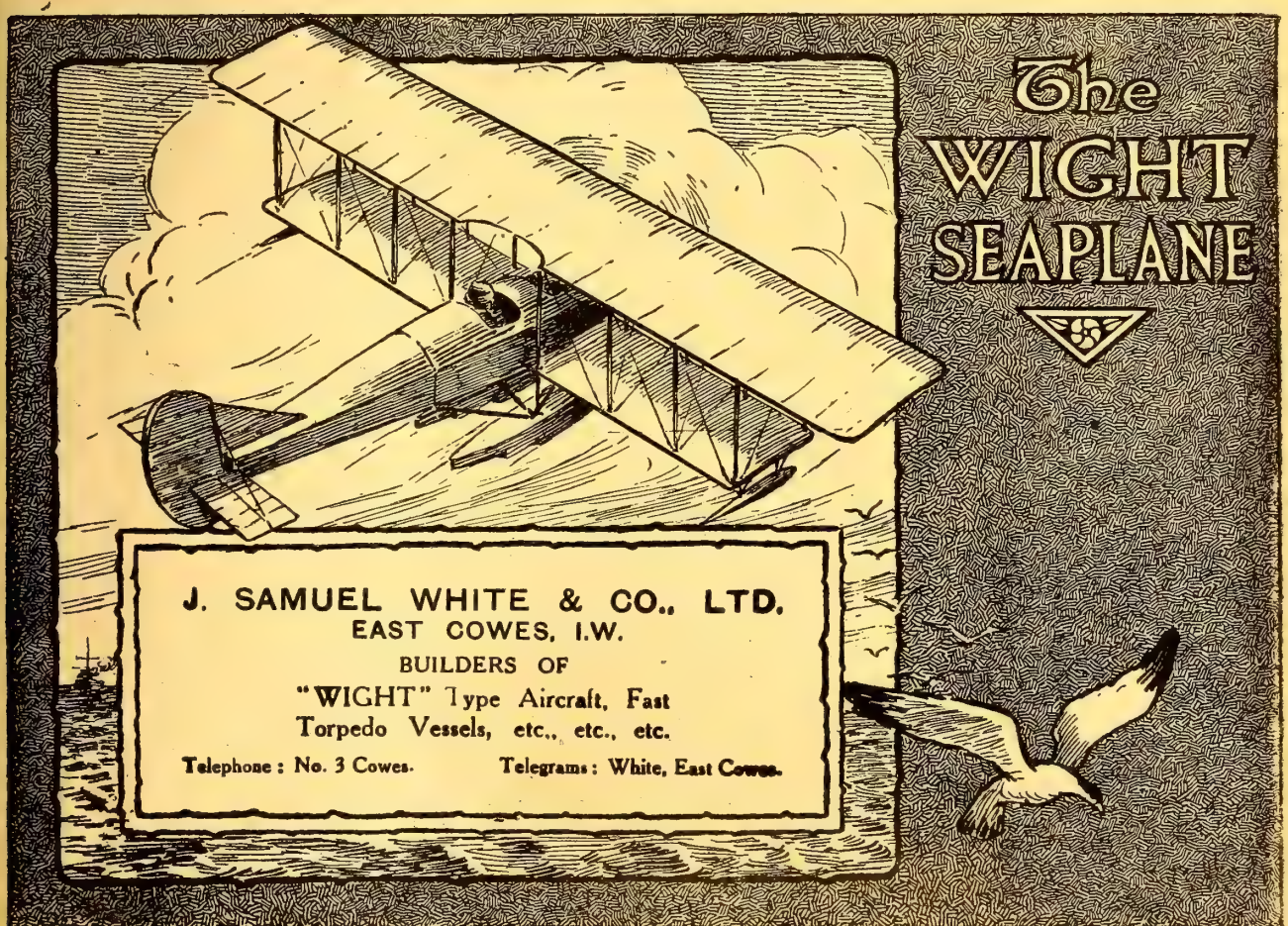
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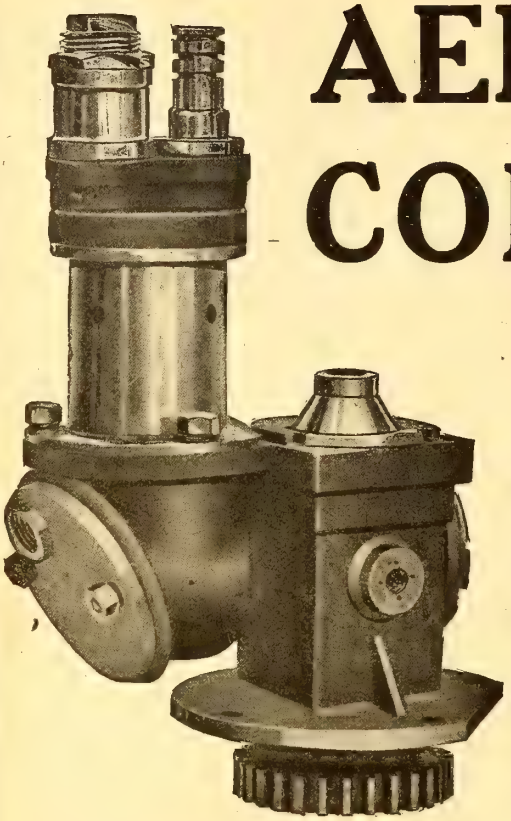
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ol Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.
n, Egerton & Co., Ltd., 379/381, Euston Road, London, N.W.1. "Manegecar, Euston-road, London." Museum 70.
ndard Motor Car Co., Coventry. "Flywheel, Coventry." Coventry 530 (4 lines).

eplates and Labels—

ish Metal (Kingston), Ltd., Kingston-on-Thames.
olithic Manufacturing Co., Ltd., 61½, Fore Street, London, E.C.2.
Clegg Metal Engraving Co., Chatsworth Works, Worthing. "Clegg Worthing."

ervation Panels—

plex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

chutes—

R. Calthrop's Aerial Patents, Ltd., Eldon Street House, Eldon Street, London, E.C. "Savemalivo, Ave, London." London Wall 3266-3267.

nt Agents—

g's Patent Agency, 165, Queen Victoria Street, E.C.4. Central 682.
e & Rowlingson, 27, Chancery Lane, E.C.4. Central 332.
nley Popplewell & Co., 38, Chancery Lane, W.C.2. Central 1763.

ern Making—

dk. Ward, 6, 7 and 8, Allsop Street, Upper Baker Street, W. Padd 4743.

ol Storage (Bulk)—

water & Co. (The Hydraulic System), Craven House, Kingsway, London, W.C.2. "Bywaterist, London." Gerrard 2220.

on Rings—

tish Chuck & Piston Ring Co., Coventry. "Rings, Coventry." Coventry 723.

er Presses and Dies—

ss, E. W., & Co., 2a, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon, London." Hop 4340.

Presswork—

Rubery Owen & Co., Darlaston, South Staffs
Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851
Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.
Integral Propeller Co., Ltd. "Aviprop, Hyde, London." Hendon 9. Kingsbury 104.
Lang Propeller, Ltd., Weybridge. "Aerosticks, Weybridge." Weybridge 520-521.
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 291, Leeds.
Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

Pyrometers—

The Foster Instrument Co., Letchworth, Herts. Foster Instruments, Letchworth. Letchworth 26.

Rigging for Aircraft—

Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466 (3 lines).

Rubber Tubing & Accessories—

Hancock, James Lyne, Ltd., 266, Goswell Road, London, E.C.1. "Masticator, Isling, London." City 3811 and 3812.

Safety Belts—

Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432.

Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay, 345 (3 lines).
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.
Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.
Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton." Southampton 1337.

Searchlights and Landing Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Seats for Aeroplanes—

Bowser, E., Art Cane Works, 50 Park Lane, Leeds. Central 3437.

Shackles—

The British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow. "Golshel, Hounslow." Hounslow 254.

Sheet Metal Pressings—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.
W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk, Bham." Central 550.
British Metal (Kingston), Ltd., Kingston-on-Thames.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 497 Birmingham.
Rubery Owen & Co., Darlaston, South Staffs.

Sheet Metal Work— Thames.

British Metal (Kingston), Ltd., Kingston-on-
Evans, Joseph, & Co., Ltd., Liverpool Street Mills, Birmingham. "Adept, Birmingham." Central 733 (3 lines).
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Rubery Owen & Co., Darlaston, South Staffs.
The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.

Shock Absorbers (Elastic Cord)—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Sparking Plugs—

Forward Motor Co., Summer Row, Birmingham. Central 6259.
Hobson Manufacturing Co., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.
Lodge Sparking Plug Co., Ltd., Rugby. "Ignifer, Rugby." Rugby 235.
Ripault, Leo, & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758.

Stampings— Avenue 1432.

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3.

Springs—

Dart Spring Co., West Bromwich. "Dart, West Bromwich." West Bromwich 322.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Steel—

Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.
Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham." Smithwick 224.

Steel Tension Wires—

Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466

Steel Tubes for Aeroplanes—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Taper Pins—

Mountford, Fredk. (Birmingham), Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262.

Tapes and Smallwares—

Brown, Percy, & Co., 49, Newgate Street, London, E.C.1. "Ominate, Cent, London." City 4659.
MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.
James North Hardy & Son, Ltd., 54, Portland Street, Manchester. "Hardson, Manchester." Central 6471.

Timber—

Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Entikosil, Vic, London." Victoria 5073, 4210.
Brown, R. F., & F. W., Wollaton Saw Mills, near Nottingham. "Brown's Saw Mills, Wollaton." Nottingham 1526.
J. Owen & Sons, Ltd., 199a, Borough High Street, S.E.1. "Bucheron, London."

Time Recorders— Hop 3811 (2 lines).

Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310.

Turnbuckles—

Rubery Owen & Co., Darlaston, South Staffs.

Tyres and Wheels—

The Palmer Tyre, Ltd., Shaftesbury Avenue. "Tyricord, Westcent." Gerrard 1214 (5 lines)

Varnishes—

Clark, R., Ingham, & Co., Caxton House, S.W.1. "Pearline, Vic, London. Victoria 2923.
Harland, W., & Son, Merton, London, S.W.19. "Harland, Wimbledon 45." Wimbledon 45 and 1395.
Naylor Bros., Ltd., Southall, Middlesex. "Naylor, Southall." Southall 30.

Washers— Avenue 1432.

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3.
Herbert Terry & Sons, Ltd. Redditch. "Springs, Redditch." Redditch 61.

Watchmakers and Jewellers (Silver Models)—

Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 9091 (3 lines).

Welding and Cutting Plant—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Welding Repairs—

Barimar, Ltd., 10, Poland Street, W.1. "Bariquamar, Reg, London." Gerrard 8173.
The New Welding Co., 26, Rosebery Avenue, London, E.C.1. "Windoneeda, Holb, London." Holborn 5252.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London."

Wind Shields— 3540 Victoria (3 lines).

Auster, Ltd., 133, Long Acre, W.C. "Winflector, London." Regent 5910.
London Label Co., Ltd., Hadley Works, Beckton Road, E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Wire Gauze—

N. Greening & Sons, Ltd., 16, Finsbury St., London, E.C.2. "Setscrew, Finsquare, London." London Wall 1082.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

Wires and Cables (Aeroplanes)—

Bruntons, Musselburgh, Scotland. "Wiremill, Musselburgh." Musselburgh 28.
Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466

Wirework— (3 lines).

Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Woodworking Machinery—

Robinson, Thomas, & Son, Ltd., Railway Works, Rochdale. "Robinson, Rochdale." Rochdale 467.
Sagar, J., & Co., Ltd., Halifax. "Sawtooth, Halifax." Halifax 136.
Wadkin & Co., Leicester. "Woodworker, Leicester." Leicester 2614.

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Acetylene Welding Plant—
Acetylene Corporation of Great Britain, Ltd., 30, Victoria Street, Westminster, Th., 40, Victoria Street, London." Vic 4830. S.W.1. "Flamma, Vic, London." Vic 4830.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." don, S.W.1. 3540 Victoria (3 lines).

Aeroplane Manufacturers—
Aircraft Manufacturing Co., Ltd., Hendon. "Airmanship, Hyde, London." Kingsbury 180.
Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne." Gosforth 500.
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.
British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol." Bristol 3906.
British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudroplan, Crickle, London." Hampstead 5551.
Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6. Hampstead 4403 and 4404.
Davidson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1143-1145
Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1176.
Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 120.
Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophid, Crickle, London." Hampstead 7420.
Mann, Egerton & Co., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
Martinsyde, Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge." Woking 331; Byfleet 171.
National Aircraft Co., Ltd., 15, Hackney Road, N.E.2. London Wall 6725.
"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London." Willesden 2455.
Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48.
The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis, London." Putney 2230-2231.
Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester." City 8530-8531, Manchester.
Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes." Cowes 193.
Short Bros., Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London" Regent 378.
Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston." Kingston 744.
Standard Aircraft Manufacturing Co., Effingham House, Arundel Street, W.C.2. "Gunsignal, London." City 80.
Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickerlyta, Knights, London." Kensington 6810.
Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil" Yeovil 129
White, J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes." Cowes 3

Airships—
Airships, Ltd., High Street, Merton. Wimbledon 1314.
Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, 'Phone, London." Regent 378.

Aluminium Castings (Sand & Die)
Coan, R. W., 219, Goswell Road, London, E.C.1 "Krankases, Isling, London." City 5846.

Bearings (Etonia Cast Phosphor Bronze)—
Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3027.

Brass Sheets for Tipping Propellers—
Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London" "

Buildings—
Avenue 995, 996, and 7006.
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation Norwich." Norwich 851.
Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313
Rubery Owen & Co., Darlaston, South Staffs.
The Wilfley Co., Ltd., Salisbury House, London Wall, E.C.2. "Wrathless, Phone, London." City 2681-2
Cable Coverings and Cable Controls—
Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Capstan Work—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Carburettors—
Hobson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.

Casein—
Nieuwbof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3. "Surie don, Fen London." Avenue 34 & 35.

Castings—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Castings (Aluminium, Brass, Bronze, Machined or, Rough)—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Celluloid (Non-Flam.)—
Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7.
London Label Co., Beckton Road, E.16. "Lonlabel, Canning, London." East 1300.

Clothing—
Burberry's, Ltd., Haymarket, S.W.1. Regent 2165.
Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6.
Hazel & Co., 4, Princes Street, Hanover Square, W.1. Mayfair 4071-2.
Robinson & Cleaver, Ltd., Regent Street, London, W.1. Gerrard 1070.

Component Parts—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
B. D. V. Aircraft Spares, Syon Chambers, 163, Kew Road, Richmond, Surrey. "Aeros, Richmond." Richmond 1681.
Central Aircraft Co., Palmerston Works, High Rd., Kilburn, N.W.6. Hampstead, 4728.
Evans, Joseph, & Co., Ltd., Liverpool Street Mills, Birmingham. "Adept, Birmingham." Central 733 (3 lines).
The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aercracons, Canning, London." East 1300.
The Osborne Aircraft Co., Ltd., Whin Hill, Greenock, Scotland. "Cordage, Greenock." Greenock 618.

Cords, Tapes, and Threads—
MacLennan, J., & Co., 30, Newgate Street, E.C.1. And at Glasgow City 3115.

Dopes—
British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312.
British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellutate, London." Regent 4046.
Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawb, London." London Wall 5350-3622.
Clark, Robert, Ingham & Co., Ltd., Caxton House, S.W.1. "Pearline, Vic, London." Victoria 2923.

Electrical Accessories—
Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 1564.
Mann, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston, London." Museum 70.
Premier Electric Heaters, Ltd., 258, 259, and 360, Bradford Street, Birmingham. "Fahrenheit, Birmingham." Midland 981.

Electric Cables—
E. Kalker & Co., Coventry. "Kalker, Coventry." Coventry 24x.
Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 1564.

Electric Lighting and Power—
E. Stanley Fardon, A.M.I.E.E., 67, Mosley Street, Manchester.
Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 1564.

Engines and Parts—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford. "Pump, Bedford." Bedford No. 1.
Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.
The Beatty School of Flying, Ltd., The Broadway, Cricklewood, N.W.2. Hampstead 3000.
Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London." Gerrard 278.
Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London S.W.1. "Aeroflight, Vic, London." Vic 7026.
Evans, Joseph, & Co., Ltd., Liverpool Street Mills, Birmingham. "Adept, Birmingham." Central 733 (3 lines).
Gordon Watney & Co., Ltd., Weybridge. "Mercedès, Weybridge" Weybridge 550 (7 lines).
Green Engine Co., Ltd., Twickenham.
Gwynnes, Ltd., Hammersmith Iron Works, Hammersmith, W. "Gwynne, Hammersmith." Hammersmith 1010.
Napier & Son, D., Ltd., 14, New Burlington St., London, W., and at Acton, W. "Nitrifier, London." Gerrard 8926.
Robertson, J. H., & Co., 1, Albemarle Street, London, W.1. Regent 3096.
Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1. "Rollhead, London." Gerrard 1654-5-6.
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.

Engines and Parts (continued)—
Sturtevant, B. F., Co., Ltd., Hyde Park, Boston, U.S.A.
Sunbeam Motor Car Co., Ltd., Wolverhampton. "Moorfield, Wolverhampton." Wolverhampton 968.
The Gnôme & Le Rhône Engine Co., Ltd., 47, Victoria Street, S.W. "Elevetes, London." Walthamstow 408 (3 lines).

Flare Lights—
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London" 3540 Victoria (3 lines).

Flexible Shafts—
Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Flying Schools—
Bournemouth Aviation Co., Ltd., Talbot Village, Bournemouth. "Etches, Winton." Bournemouth 1167.

Furniture (Office)—
Cooke's (Finsbury), Ltd., Finsbury Pavement House, London, E.C.2. London Wall 573 and 6178.

Galvanising—
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.
The Rustless Iron (Cowper Coles Process) Co., Ltd., 1, French St., Sunbury-on-Thames, Middlesex. Sunbury 37.

Gears—
Moss Gear Co., Ltd., Thomas Street, Aston, Birmingham. "Mosgear, Birmingham." East 407.

Glue—
Central Chemicals, Ltd., 283, West End Lane, London, N.W.6. "Entramical, Westhamp, London."
Improved Liquid Glues Co., Ltd., Gt. Hermitage Street, E. (Croid.). "Excroides, Wapp, London." Avenue 3178.
Mendine Co., 8, Arthur Street, E.C. Bank 9375.
Oldroyd, Wm., & Sons, Ltd., 9, Mincing Lane, E.C.3.

Goggles—
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Heating and Ventilating—
Chas. P. Kinnell & Co., Ltd., 65 & 65a Southwark Street, London, S.E.1. "Kinnell, London." Hop 372 (2 lines).

Hollow Spars—
McGruer Brentwood Hollow Spar Co., Commercial Wharf, Lamoeth, S.E. "Gabrielson, Watloo, London." Hop 718, 719, and 3758.

Instruments—
British Wright Co., Ltd., 33, Chancery Lane, W.C.2. Holborn 1748.

Instruments (Scientific, Altimeters, etc.)—
The Cambridge Scientific Instrument Co., Ltd., Cambridge. "Instrument, Cambridge." Cambridge 640.
Short & Mason, Ltd., Macdonald Road, Walthamstow, E.17. "Aneroid, Phone, Walthamstow, London." Walthamstow 180.

Machine Tools—
Brewster & Co., 11, Queen Victoria Street, E.C.4. "Circumfuse, Cannon, London." City 768.

Magneto Driving Pieces—
Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Magnetos—
The M-L Magneto Syndicate, Ltd., Victoria Works, Coventry. "Corlton, Coventry." Coventry 1008-1009.
The British Lighting & Ignition Co., Ltd., 204, Tottenham Court Road, W.1. "Vitaliting, Phone, London." Museum 430.

Metal Manufacturers—
Clifford, Chas., & Sons, Ltd., Birmingham. "Clifford, Birmingham." Central 1243.
Evans, Joseph, & Co., Ltd., Liverpool Street Mills, Birmingham. "Adept, Birmingham." Central 733 (3 lines).

Metals in General—
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.
Samuel Mercer & Co., 198, Upper Thames Street, E.C.4. "Reconciled Cannon, London." City 8440.
Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London" Avenue 995, 996, and 7006.

Metal Parts and Fittings—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
Aircraft Supplies Co., Ltd., Ascot House, Long Acre, W.C.2. "Upcast, London." Gerrard 276 (3 lines).
Arnott & Harrison, Ltd., Hythe Road, Willesden Junction. Willesden 2207.
Bayliss, Jones & Bayliss, Ltd., Wolverhampton. "Bayliss, Wolverhampton" (Bolts and Nuts.) Wolverhampton 1061.
The Birmingham Guild, Ltd., 45, Gt. Charles Street, Birmingham. "Handicraft, Birmingham." Central 1570.
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

Parts and Fittings (contd.)—
...Gold Shell Ring Co., Ltd., Inver... Road, Hounslow, London. "Golshel, ... Hounslow 254.
... (Kingston), Ltd., Kingston-on-...
...B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.
... & Co., Ltd., 177, Cleveland ... London, W.1. "Installing, Euston ... Museum 70.
... Ltd., Fremo Works, Lif... "Fremo, Birmingham." Kings Norton 261
... & Co., 1, Albemarle Street, ... W.1
... & Co., Ltd., Darlaston. "Roofs, ... Darlaston 87.
... & Sons, Ltd., Wellington, ... "Sankey, Wellington, Salop." Wellington 66.
... Aero & Engineering Co., Ltd., ... House, Kingsway, W.C.2. Regent 1181.
... Construction Co., Harley Works, ... Road, E.16. "Aercracons, Canning, ... East 1300
... Bros., Ltd., Bradley, Bilston. ... Bros., Bilston." Bilston 10.
... Co., Ltd., Old Oak Com... ... Lane, Willesden Junction, N.W.10.

Shearing Tools—
... Smith, & Co., Ltd., Tangent ... Keynsham, near Bristol. "In... Saltford." Keynsham 21.

Spinnings—
... & Co., 4 and 5, A B Row, Birming... "Gabriel, Birmingham." Central 1223.

Bolts—
... Bros., Zota Works, Hildreth Street, ... S.W. Battersea 415.
... & Co., Darlaston, South Staffs.

Cellaneous—
... D., & Son, Ltd. (Roofs), Belfast. ... Belfast, "Belfast 4033-4034-4035.
... Glass Co., Ltd., 76, Turnmill Street, ... Central 3731.
... Wire, Ltd., Willesden Junction, ... Willesden 2400 (3 lines).
... Metal (Kingston), Ltd., Kingston-on-...
... Bros., Ltd., Great Eastern Street, ... "Imbrowned, Bethroad, London." London Wall 6100.
... Manufacturing Co., Ltd., 61½, Fore ... London, E.C.2. Labels in Metal, ... Ivorine, etc.
... Ltd., Chapel-en-le-Frith, ... Derbyshire, Birmingham." Central 703.
... Manufacturing Co., Ltd., 211, City ... E.C. City 6558.
... Label Co., Ltd., Harley Works, ... Road E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, ... East 1300.
... J., & Co., 30, Newgate Street, ... and at Glasgow. Tapes, Cords and ... City 3115.

Cars—
... Johnston, Ltd., Dumfries. "Mocar, ... Dumfries 281-282.
... Egerton & Co., Ltd., 379/381, Euston ... London, N.W.1. "Manegear, Euston, ... Museum 70.
... Motor Car Co., Coventry. "Flywheel, ... Coventry 530 (4 lines).

Plates and Labels—
... Metal (Kingston), Ltd., Kingston-on-...
... Manufacturing Co., Ltd., 61½, Fore ... London, E.C.2.
... Metal Engraving Co., Chatsworth ... Worthing. "Clegg Worthing."

Servation Panels—
... Safety Glass Co., Ltd., 1, Albemarle ... Piccadilly, W.1. "Shatterlys, Piccy, ... London." Regent 1340.

Parachutes—
... Colonel Capt. Aerial Patents, Ltd., Eldon ... Eldon House, Eldon Street, London, E.C. ... Eldonaero, Ave, London." London Wall 3366-3267.

Patent Agents—
... Patent Agency, 165, Queen Victoria ... London, E.C. Central 682.
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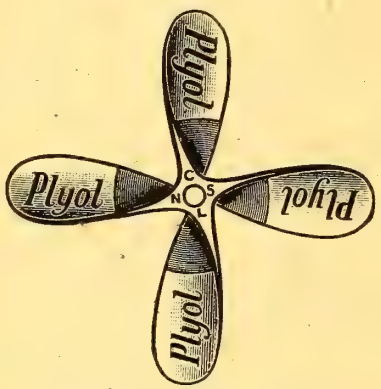
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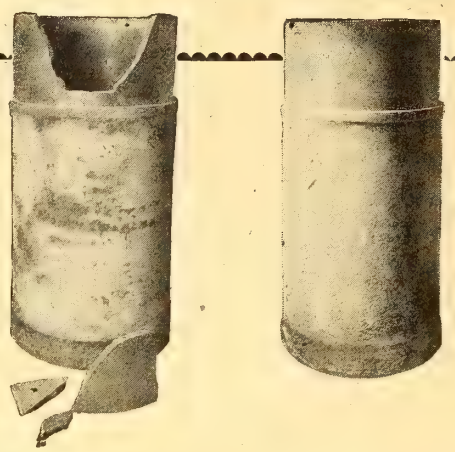
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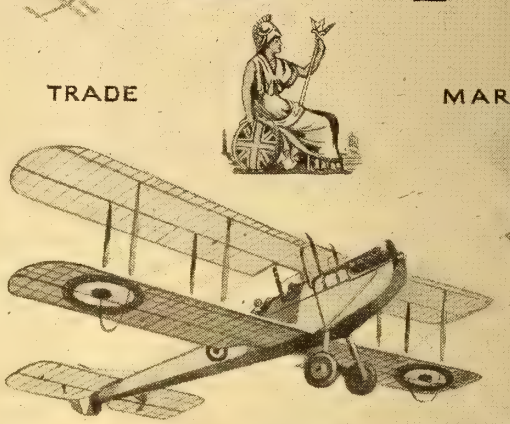
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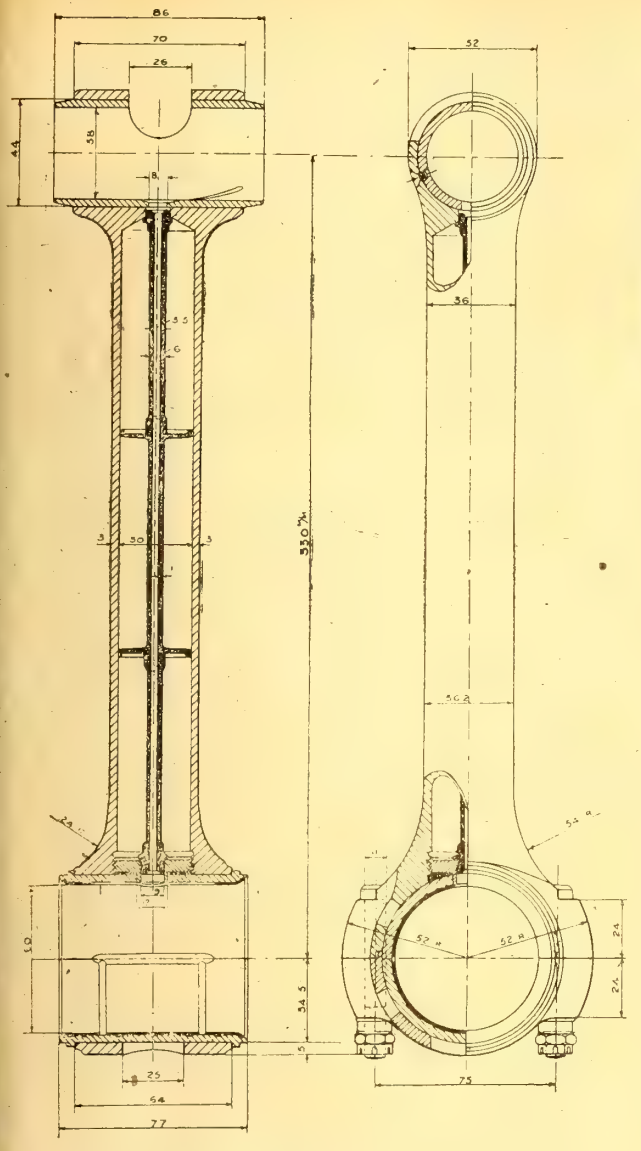


Fig. 9.—Sectional Details of Connecting Rod.

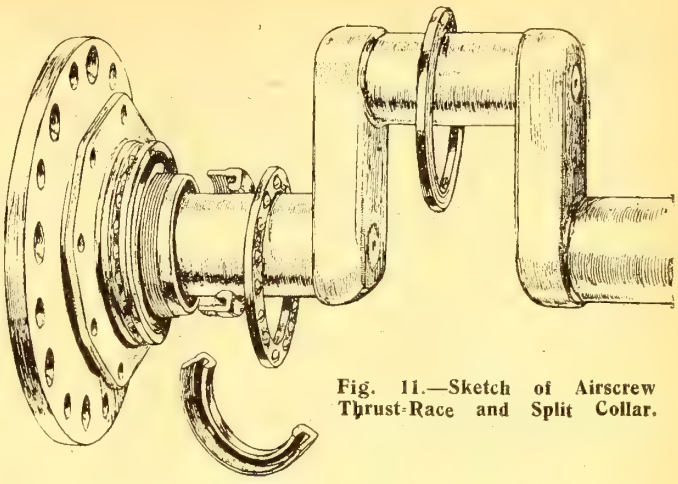


Fig. 11.—Sketch of Airscrew Thrust-Race and Split Collar.

Crankshaft.—The six-throw crankshaft runs in seven plain bearings, and weighs 109.25 lbs., including the airscrew boss.

The cranks are, of course, set at 120°, and the diameter of all the journals is 62 mm., whilst that of the crank-pins is 60 mm. The length of the front journal bearing (propeller end) = 79 mm., and the length of the other journal bearings = 54 mm., with the exception of the rear end bearing, which is 55 mm.

The crankshaft journals and crank-pins are bored for lubrication, the webs being drilled with communicating holes in the usual manner. The internal diameter of the holes bored in both crank-pins and journals is 27 mm. The ends of the holes are plugged with sheet-steel discs sweated into the recessed ends, and all the discs which plug the rear ends of the holes in both the crank-pins and journals are drilled with a central 5-mm. hole presumably with the idea of lubricating the camshafts with the oil thrown out by the cranks.

A double-thrust ball race, 120 mm. diameter, is fitted at the front end of the crankshaft behind the front flange to which the propeller hub is bolted. The thrust races are large enough to be assembled over the cranks, and are secured in position by a split collar which is screwed on to the crankshaft. The halves of the split collar are held together on the screw thread on the shaft by a recess cut in the split collar. This recess holds a corresponding flange turned on the crankshaft. Details of this construction are shown in the sketch Fig. 11.

Fitted to the rear end of the crankshaft is a friction clutch for operating the wireless drive, which is designed so that the driving brake-shoes of the clutch can be thrown in or out of engagement with the driving pulley from the pilot's seat, through the action of two wedges, which operate the friction shoes through ball-ended levers.

The propeller boss is attached to the crankshaft by a flange which is bolted to a corresponding flange on the end of the crankshaft by eight 14-mm. bolts. Full details of the propeller boss are given in the sectional drawing to be published next week.

Valves and Valve Gear.—The twin inlet and exhaust valves work vertically in the cylinder heads, and are operated as previously mentioned by rockers mounted on ball bearings, carried by supports screwed into the cylinder head. The general design of the complete valve-gear is clearly shown in the sectional drawings (Figs. 4 and 5), and full details of the valves and valve springs, etc., in Figs. 12 and 13.

The rocker levers operate the valve stems through hardened steel rollers which are mounted on eccentric bolts. These, in conjunction with adjustable spherical joints screwed into the top ends of the vertical push rods on each side of the cylinders, give a fine adjustment for the tappet clearances. The spherical joints on the valve rockers are evidently provided to simplify the alignment of the valve rocker supports which are screwed into the cylinder heads.

Semi-spherical joints are also provided at the bottom ends of the push rods, which work in steel cups inside the hollow tappets, and it should be noted that the hardened steel rollers

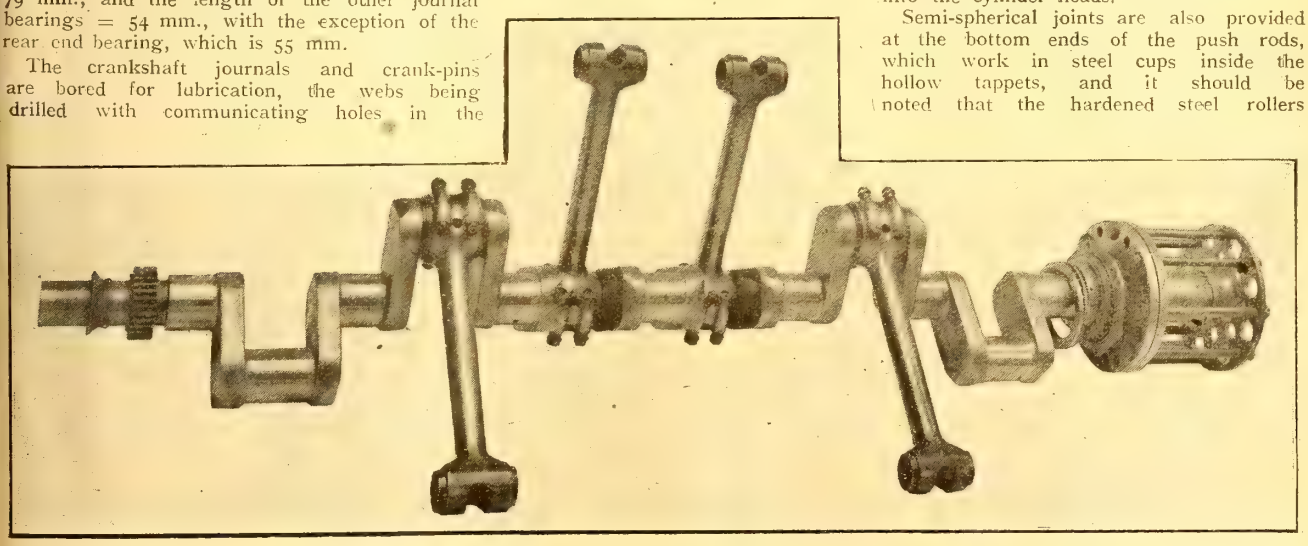


Fig. 10.—General View of Crankshaft, with Connecting Rods and Airscrew Boss.

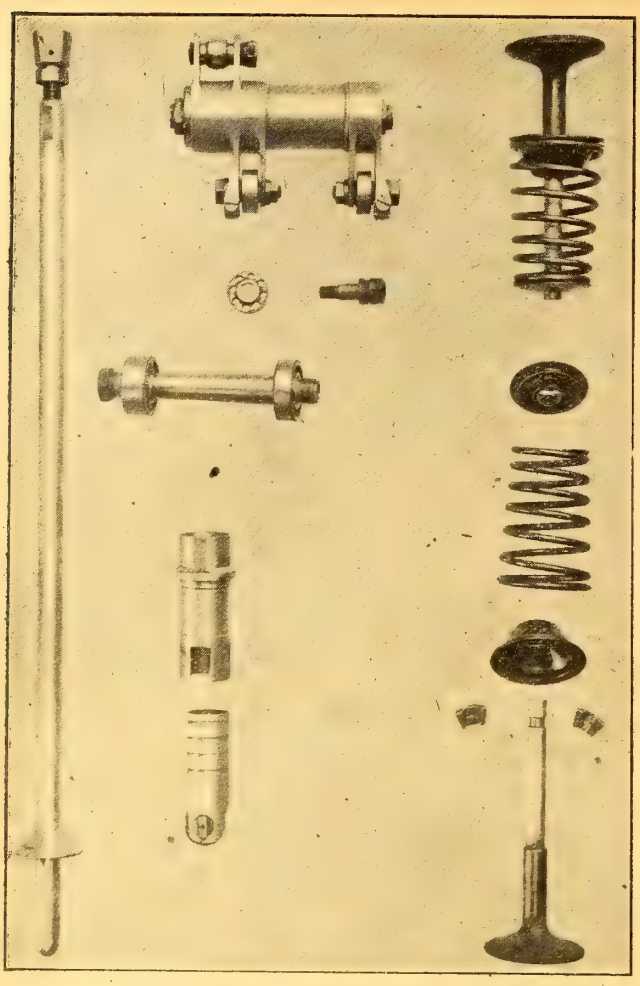


Fig. 12.—Showing Valves, Valve-Springs, Caps and Cotters; Rocker and Rocker-Rollers, with Ball-Races; Rocker Spindle and Bearings; Push Rod; Tappet and Tappet-Guide.

of the tappets, are slightly off-set from the camshaft centres and each pair of tappet guides is held in position by a steel bridge clamp.

The dimensions of both the inlet and exhaust valves are the same, each valve weighing 1.25 lbs. The lift of the inlet valve $=0.465''$ and lift of the exhaust valve $=0.443''$. Clearance of inlet tappet $=0.009''$, exhaust $0.015''$.

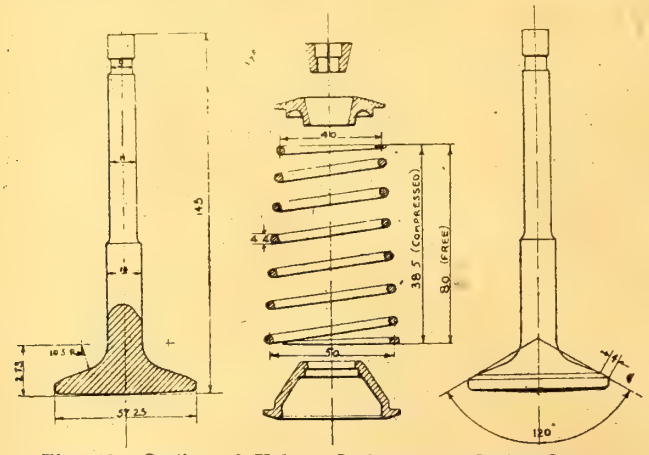


Fig. 13.—Section of Valves, Springs, and Spring-Caps.
(To be continued.)

PRACTICAL AIRCRAFT CONSTRUCTION.

A very large number of inquiries have been received as to whether the series of articles on Aircraft Construction, by Mr. Stepney Blakeney, which recently appeared in the "Aeronautical Engineering" Supplement of THE AEROPLANE, are to be reprinted. The announcement that a reprint is in course of preparation may save unnecessary correspondence. As soon as the volume is ready for sale the fact will be duly noted in THE AEROPLANE.

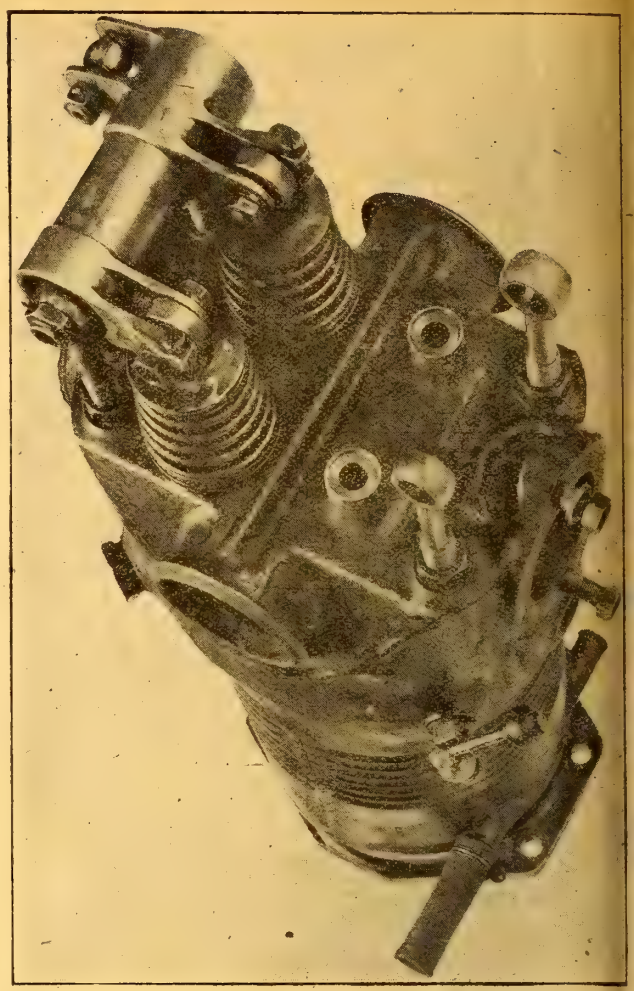


Fig. 14.—Top of Cylinder Showing General Arrangement of Valve Gear.

TO A SCHOOL-'BUS: REQUIESCAT.

The great twin engines start to roar as I let them take the juice,
And the waves are sliding past us now as I turn her up the wind;
My heart is singing and light as air—as light as tapered spruce.
"Speed up—you swine—that motor-launch is leaving us behind!"

Soaring up from the feathery waves, she leaves the swirling tide,
And mounts with the grace of a towering bird to the misty morning sun.
She wouldn't unstick for a mile at least, tho' all the while I tried
To lift her up, the darned old swine, the soggy old female Hun.

Gliding over the tapered masts of the envious anchored fleet,
With the strength of full two hundred horse that throw their weight in line.
My oath! this game has made me sweat. She's nearly got me beat,
Flopping around like a wounded duck—no more of this for mine.

With stately pride, with a whistle of wings she stoops to the tide anew,
With never a splash, like a lighting gull, she meets the sparkling sea.
You thrice-bestrafed and worn-out brute—so that's the last of you—
Confound you, Steamboat! Get the floats, and then come back for me.

[N.B.—The type of machine—two 100 h.p. engines, with floats, and used for school work, is designed for the convenience of the Censor.]


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THE PATENTS INDEX.

The subjoined list of recent inventions has been specially compiled by THE AEROPLANE from the current Official Patents Records.

PATENT APPLICATIONS.

Aircraft Manufacturing Co. Liquid-fuel tanks for aeroplanes, etc. No. 17975. Dec. 4th.

Blackburn Aeroplane and Motor Co. Indicators for aircraft. No. 18166. Dec. 7th.

Breweton, A. E. Gyroscopical direction-indicators. No. 18246. Dec. 8th.

Buckham, Sir G. T. Fire-control apparatus for anti-aircraft guns. No. 17967. Dec. 4th.

Cook, H. J. T. Combined propelling and silencing mechanisms. No. 18110. Dec. 6th.

Crosse, E. Grinding aeroplane axles, etc. No. 18160. Dec. 7th.

Davidson, J. E. Struts for aeroplanes. No. 17828. Dec. 3rd.

Driver, F. P. Petrol tanks for aircraft. No. 18179. Dec. 7th.

Jackson, J. G. Aeroplanes. No. 18180. Dec. 7th.

Lanchester, F. W. Structural sheathing material for boat-hulls and aeroplane fuselages, etc., and as a substitute for multiply wood, leather, etc. No. 17935. Dec. 4th.

Lanchester, F. W. Mechanism for receiving and launching aeroplanes at sea. No. 18197. Dec. 7th.

Lanchester, F. W. Instrument for detecting change of course in aeroplane or vessel at sea, and for measuring rate of change. No. 18198. Dec. 7th.

McGruer, E. Manufacture of aerial propellers. No. 17994. Dec. 5th.

Mayrow, J. J. Aeronautical machines. No. 18232. Dec. 8th.

Piggot, W. C. Apparatus for propelling ships and aircraft, etc., by means of jets. No. 17913. Dec. 4th.

Schmuker, A. Aeroplane propeller. No. 17835. Dec. 3rd.

Soc. Anon. d'Aviation L. Bréguet. Aircraft. No. 17940. Dec. 4th.

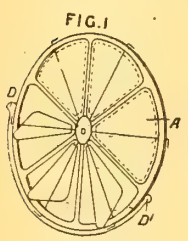
Soc. Anon. des Etablmts: L. Blériot. Ignition systems for explosion engines, etc. No. 18022. Dec. 5th.

Wheeler, J. Aeroplanes. No. 17838. Dec. 3rd.

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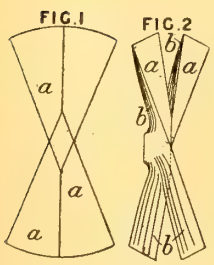
111498. Sept. 22nd, 1916. Calthrop, E. R. Parachutes.

ABRIDGMENTS OF RECENTLY PUBLISHED SPECIFICATIONS.



110,201. Propellers. ROBERTS, H., Bryn Eistedfod, Clynnog, Carnarvon.

A propeller for boats, flying-machines, and vehicles comprises a wheel between the spokes of which are arranged floats A mounted to turn on radial axles or pivots. These floats are feathered by an adjustable obstacle D, D^1 mounted loosely on the axle of the fheel.

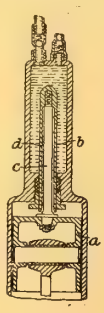


110,366. Screw propellers. PERCEVAUT, E. J. M., Retiers, Ille-et-Vilaine, France.

The propellers described in Specifications 101,425 and 101,427 have the blades *a* progressively widened on the side of and up to the prolongation of the line bisecting the angle of 45 degrees of the plate of each blade. The wing of each blade has also a back support *b* and each blade has one or more wings, and there is a variable angle of incidence of the blades.

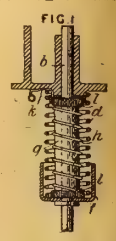
110,348. Reciprocating pumps. PELTERIE, R. ESNAULT-, 11, Rue, de Milan, Paris.

The plunger *b* is connected to the cross-head *a* by a transversely flexible rod *c*, which has considerable clearance *d* in the plunger, so that the lateral play of the cross-head is not transmitted to the plunger. The invention is applicable also to pistons.



110,391 Lubricators. JOSEPH, S., 94, Maida Vale, London.

To lubricate the valve guides of internal-combustion engines for motor-vehicles, aeroplanes, etc., each valve-stem *b* is surrounded by a tubular wick *g* supported by a light helical spring *h* enclosed within the valve spring *d*. A cap *f* at the lower end retains lubricant, which may be supplied by a pipe *k* at the upper end. The wick is secured to the spring *h* by a cotton or leather binding *l* or by metal clasps, and it may be fixed also to the coils intermediate of the ends. The cup *f* may consist of a cylinder of fibre, etc., secured to the lower binding *l* within the spring *d*. Laces may be wound around the wick *g* between the coils of the spring *h*, and the wick may be folded back to lie over the outside of the spring. The wick may consist of more than one fold of material and it may be wider at the lower end than at the upper. The material employed for the wick is cotton treated with alum, felt, or flannel, or it may consist wholly or partly of asbestos.



AMERICAN PATENTS AND THE WAR.

A report from Washington on Oct. 11th states that legal approval has been given to an agreement between the Aircraft Production Board and the Airplane Manufacturers' Association to pool the rights of the Airplane Manufacturers' Association in the Wright, Curtiss, and other aeronautical patents. Details of the scheme are lacking, but it is hoped that the arrangement will reduce considerably the amounts of the Royalties payable by American manufacturers to the owners of these patents.

MORE DISLOYAL WORKERS.

About 1,200 aeroplane workers (another account says 3,000) are affected by a strike decided on unanimously at a meeting in Bristol on Dec. 13th. At present the strike is confined to the woodworkers on aeroplanes only, and the workers in other branches of aeroplane construction are continuing in their employment.

The cause of the strike is, according to the men, a question of percentages in payment and an alleged delay by the authorities with reference to awards recently made. The strike involves two factories. The aircraft workers are asking for a 12½ per cent increase, plus 5s., this being the trade figure recently awarded in the engineering trades. The employees who come under the head of engineers have received the grant, and so they have not ceased to work. They have, however, handed in notices in sympathy with the other workers who have come out.

ON COVENTRY.

The following letter has been received:—

Manchester, Dec. 8th, 1917.

SIR,—After reading your article in current issue *re* the Coventry affair, I feel constrained to write and tell you that I endorse your remarks and am in agreement with you in your just and righteous anger against the "enemies in our midst," traitors and loafers.

You will doubtless receive shoals of correspondence, in antagonistic vein; therefore I write to thank you for the straight, unvarnished, outspoken indictment, and to wish you all strength to your pen in showing up these men in their true colours.

(Signed) C. F.

[Curiously enough not one condemnatory letter has been received, though appreciative letters have come from every part of Great Britain.—Ed.]

THE GERMAN INDUSTRY.

The following notes concerning the German Aircraft Industry have been received from a neutral country:—

The airship-building Schütte-Lanz firm, Mannheim-Rheinau, announces that they imbue wood by the Schütte-Lanz smoke and resin proceeding, the resin protecting air and seaplanes better against moisture than the best varnishes, and the smoking rendering the glue capable of resisting water.

The existence of another Zeppelin works is told when the Zeppelin Works (Lindau) Co., Ltd., in Lindau-Reutin, Bavaria, advertise for engineers for their aeroplane manufacturing department.

A CHANGE OF ADDRESS.

It should be noted that Robert Ingham Clark & Co., Ltd., varnish and enamel manufacturers, whose offices were at Caxton House, Westminster, have been forced, owing to the commandeering of the building by the Army Council, to transfer their registered office to Walter House, Bedford Street, Strand, W.C.2. The telegraphic address is Pearline, Westrand, London, and the telephone number is Regent 3923.

AEROPLANE TESTING.

Aeroplane constructors who require the services of a steady and reliable pilot for experimental or acceptance work are invited to apply to the editor of THE AEROPLANE, who can put them in touch with a pilot who is open to accept a contract.

THE

'Guardian Angel' Parachutes



Every week we publish a few lines in the Aeronautical Journals, which we believe to be of real concern to Aviators. What we have had to say has varied weekly, but in the same week we have said the same thing in each journal. Those who have access to files of these papers may find that what we have said, since the beginning in August last, is worth looking up. Our advertisements are not published for the sake of making sales—for our entire output is taken up by the Air Board for the use of the British and Allied Air Services—but with the sole object of informing officers and men of the capacity and utility of a life-saving appliance, with which but very few have any personal acquaintance. Most have heard of it; but that is all. As yet there are not a dozen officers in all the services who thoroughly understand the principles of its action, or who could pass an examination in the details of its construction and assembly. A good many more know that it opens with astonishing celerity; but they do not know how, or why.

In our advertisements we have described briefly what the "Guardian Angel" Parachute will do. We have, as briefly, dealt with the principles of its automatic and instantaneous action; with the immediate support it gives to the Aviator, and the curtailment of free fall to the minimum; with its enforced opening, and the static and kinetic control of its parts, which makes it a *machine*, permitted no vagaries, but compelled to do the same thing, in the same way, every time it is used. We have referred to its efficacy to reduce the deplorable and unnecessary wastage of useful lives on the Training Grounds; we have dealt with the risks every great fighter takes in sailing along the edge of his elastic limit in action, and we have pointed out the broadened command of his machine, and the greater tactical efficiency which will result from the embodiment of the "Guardian Angel" Parachute as part of the normal equipment of each aeroplane.

A British Engineer has given six years of the best brain work, of which he is capable, solely to the service of Flying Men. He has reduced the minimum height from which a Parachute could be dropped—and then only with trepidation on account of the incertitude of the contingencies—from 2,000 to 200 feet—the latter with the absolute assurance of its opening in time to bring its man safely to the ground—and has made the Parachute available for use with aeroplanes flying at the highest, or any speed. We ask the Flying Services to cast aside the prejudice which naturally arose from the eccentricities of the ordinary Parachute, and to take stock of the new situation which has arisen since an appliance has been placed at their service, upon which they can positively rely. The Parachute is right. It is now up to the officers and men of the Flying Services to show their dexterity in its use; and, without doubt, they can and will.

This week we again present a matter for serious consideration and discussion. In our advertisements for the week ending September 15th—and, so important was this example, we repeated it in the week ending November 3rd—we included an account of a Flying Officer's fight for life in a flaming aeroplane. There is a marked tendency on both sides to make increased use of incendiary missiles specially adapted to penetrate and fire the petrol tanks of aeroplanes. Fighting will be more and more on this basis; practice will be improved; and the numbers of such endings will rapidly increase. How can this best be countered? Think it over.

WILL FLYING OFFICERS PLEASE NOTE THAT, AS OUR ENTIRE OUTPUT IS BEING TAKEN UP BY THE AIR BOARD FOR THE USE OF THE BRITISH AND ALLIED AIR SERVICES, APPLICATIONS FOR PARACHUTES AND HARNESS SHOULD BE MADE THROUGH THEIR COMMANDING OFFICERS, AND NOT DIRECT TO US.

RELIABILITY—first. RELIABILITY—second. RELIABILITY—ALL THE TIME.

E. R. CALTHROP'S Aerial Patents, Ltd.,

ELDON STREET HOUSE, ELDON STREET, LONDON, E.C.2.

Telephones (2 lines) London Wall 3266 and 3267. Telegraphic and Cable Address—"Savemalivo-Ave-London."

WOODSIDE ENGINEERING COMPANY, LTD.,
POSSILPARK, GLASGOW.

AEROPLANE TIERODS

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STREAMLINE AND ROUND SECTIONS

COMPLETE WITH

UNIVERSAL OR FORK JOINTS

LARGE STOCKS.

PROMPT DELIVERY.

Telephones.
WORKS: 1495 Douglas (2 lines.)
OFFICE: 3456 Central (3 lines.)
(Private Branch Exchange.)
Telegrams: "FUSELAGE," GLASGOW

Registered Office
50 WELLINGTON STREET,
GLASGOW.

THE AIRCRAFT TRADER

MARKET TOPICS.

Prices given are for quantities on usual terms.

COPPER.—The position here remains unaltered. The Government still retains complete control of the market. The American position still continues to attract attention. It is gratifying to learn that the output, as foreshadowed in my report a few weeks ago, is steadily improving, and there does not now appear to be any likelihood of a shortage of Copper for national requirements. The U.S. official price remains unaltered, although there is a strong feeling that an advance is inevitable after the expiration of the present agreement with producers. If this takes place, it is more than likely that there will be a revision of prices here.

Comparative Prices.

To-day	£110 per ton.
Highest Price Last Year	153 per ton.
Lowest Price Last Year	84 per ton.

TIN.—This market is in a state of extreme nervousness, and, under present circumstances, it is absolutely impossible to foreshadow what will happen. To all appearances the Board of Trade are responsible for the present state of affairs by suppressing the shipping statistics.

Although large shipments are expected, it is not wise to rely upon them, and a shortage of this metal is looming in the distance. It will be observed from the Prices Current that the abnormal advance in the price of Tin is affecting the prices of Solder and Phosphor Copper. The prices of Tinplates, Tinned Steel, etc., are also likely to be revised.

Comparative Prices

To-day (14th)	£296 0 0 per ton.
Last Week	293 0 0 per ton.
Last Year	185 0 0 per ton.
Average Price, 1916	182 3 5 per ton.

LEAD.—This market lacks any interest whatever. Prices remain unaltered and adequate supplies are available for national requirements.

STEEL.—All the mills are at present working at fever heat, that being especially the case in the Sheffield district, where colossal efforts are being made to satisfy the demands of the aircraft constructors. The requirements for aircraft work are, however, continually increasing, and no efforts should be spared to make still further increases in the output of the various mills.

High-speed Steel is still attracting attention. Supplies are most difficult to procure, and the authorities would be well advised to give this their earnest attention, otherwise it is more than likely that there will be an acute shortage.

Cast Steel is also very difficult to procure and prices continue to advance.

TIMBER.—A few shipments of Silver Spruce have recently been received. The quantities are, however, only small compared with the ever increasing demand, and huge shipments of Silver Spruce or substitutes must be available shortly, if the programme for "Aeroplanes and more Aeroplanes" is to be carried out. Although the position, at present, is very bad indeed it could and would have been very much worse if it had not been for the very valuable and patriotic help of a few merchants, who have carried on despite obstacles.

The same patriotism has kept constructors supplied with 3-ply, although superhuman efforts will be needed during the next few months if the demands of all consumers are to be fulfilled. The question of 3-ply should be very closely investigated. There is not the slightest doubt that the enormous amount of 3-ply scrap which is made in some factories could be reduced considerably, especially in works where aircraft work has only recently been undertaken, and the foremen have only had a few months experience of aeroplane construction.

It is certainly advisable to send instructions round to all factories to make use of every piece of scrap where practicable and where a standard type of machine is being built in several factories it would save time, labour, and also material, if the Air Board had diagrams drawn up by a "practical craftsman," showing the best method of cutting up a board for the particular parts on that machine in order to procure the maximum amount of material from it.

Conservation of stocks, economical use of boards, and a quadrupled output should be aimed at, and no stone should be left unturned until all fears of any factory being short of 3-ply are entirely removed.

Very fair supplies of Mahogany have recently been received and the position is much more satisfactory.

The Board of Trade have now fixed the prices of Home Grown Timber. Readers will remember that this step was foreshadowed in my report a few weeks ago. Full details of the order will be given later. The prices of the woods used in aeroplane construction are as follows:—

SCHEDULE "A."

Maximum Prices for Standing Timber.

	c.f. s. d.
Ash, selected for aeroplane purposes	5 0
Poplar	1 3

SCHEDULE "B."

Maximum Prices for Timber in the Log.

F.O.R. Loading Station. Less 2½ per cent., C.D.

	c.f. s. d.
Ash, selected butts, 12 ft. and up, taken to the first stop or branch	7 6
Other logs	5 0
Poplar	2 9

SCHEDULE "C."

Maximum Prices for converted Hardwoods.

F.O.R. Loading Station. 2½ per cent., C.D.

	c.f. s. d.
Ash, for aeroplane purposes, logs cut through and through	8 6
Selected lengths and thicknesses of plank	10 6
Poplar, logs cut through and through	3 6
Selected lengths and thicknesses of Plank	4 6

FABRIC.—The output of Fabric is improving very satisfactorily. It is, however, very doubtful if the available supplies of flax will be sufficient to meet the huge demands now being made for linen Fabric. If sufficient flax is not obtainable then there appears to be no alternative but to adopt Cotton Fabric for certain components, if not for the whole of the machines. In any case, the situation calls for vigorous action and there is no reason whatever why well scoured Cotton Fabric cannot be used immediately on all School Machines.

It is rumoured that the price of flax will advance shortly, If this is correct, it is more than likely the official prices will be altered, although it is possible the Air Board will subsidise weavers.

CURRENT PRICES.

Dec. 13th, 1917.

The prices given below are the prices ruling on the above date.

TERMS.—Usual for the various materials mentioned.

Prices of old metals are as quoted by scrap dealers.

Prices must not be taken as specific quotations for definite quantities delivered to any part of the country.

ALUMINIUM.*

Ingot	£225 per ton.
Remelted	£210 per ton.

BRASS.

Sheets	15⅛d. per lb.
Strip	14⅛d. per lb.
Wire	14½d. per lb
Tubes	15⅜d. per lb.
Castings	15d. per lb.
Turning Rod	14d. per lb.
Brazed Tubes	19½d. per lb.

COPPER.*

Ingot, Standard, Cash	£110 per ton.*
Ingot, Standard, 3 mos.	£110 per ton.*
Best Selected (Nett)	£123 per ton.
Sheets	£147 per ton.
Wire	15⅛d per lb.
Tubes, S.D.	18½d. per lb.
Tubes, Brazed	18½d. per lb.

Rivets .....1s. 10½d. per lb., basis.
Tacks .....1s. 10d per lb.

FABRIC.*

Linen, R.A.F., 17C, Spec., 36 in. wide, 2s. 8d. p. yd.
Linen, R.A.F., 17C, Spec., 38 in. wide, 2s. 9½d. p. yd.
Spaced, R.A.F., 17C, Spec., 37½ in. wide, 1s. 9d. p. yd.

GUN METAL.

Castings .....1s. 8d. per lb.

LEAD.*

Virgin Pig .....£29 per ton. c.i.f.
Virgin Pig .....£30 per ton, ex stores.
Sheets .....£39 10s. per ton, D/d.
Pipes .....£40 per ton.
Dry White .....£46 10s. per ton, less 5 per cent.
White in Oil .....£53 per ton.
(lots over 5 cwt. less 5 per cent.)
White in Oil .....£55 per ton.
(lots under 5 cwt. less 5 per cent.)
Red .....£42 per ton, less 2½ per cent.

NICKEL.

Nickel .....£200 per ton.

PHOSPHOR BRONZE.

Ingots, 5 cwt., and under.....£154 to £175 per ton.
(Subject to Copper and Tin Fluctuations.)
Castings .....1s. 7½d. to 1s. 9½d. per lb.

PHOSPHOR COPPER.

Ton lots .....£200 to £205 per ton.

SILVER.

Silver .....42⅞d. per oz.

SOLDER.

Plumber's .....120s.
Tinman's .....165s.

STEEL.*

High Speed, 14 p. cent., Tungsten, 2s. 10d. per lb., basis.
High Speed, 18 p. cent., Tungsten, 3s. 10d. per lb., basis.

ALLOY STEELS TO AIR BOARD SPECIFICATIONS.*†

Round and Square :—

Specification No. S2 .....£82
Specification No. S2 (bright-drawn) £115
Specification No. S8 .....£86
Specification No. S10 .....£70
Specification No. S12 .....£75
Specification No. S14 .....£43
Specification No. S15 .....£70
Specification No. S16 .....£70
Specification No. S17 .....£75
Specification No. S18 (oil-hardened) £85
Specification No. K1 .....£75
Specification No. K2 .....£75
Specification No. K3 .....£86

The above prices are for ¼ in. to 5/16 in. only, other sizes are proportionate

HEXAGONS.	.455 and .525	.601 to .710.
Specification S2	£79	£77
Specification S8	£79	£77
Specification S2 (bright-drawn),	£112	£112
Specification S8 (bright-drawn),	£112	£112

SPELTER.

English f.o.b., Birmingham £57

TIN.

Tin £296

TINPLATES.

Tinplate .....30s., basis, f.c.t.

TIMBER.

	*†Official.	Merchants.
Silver Spruce, 10s. 4d.		18s. 6d., c.f.
Poplar and Cottonwood		15s. to 16s.
Cypress		15s.
English Ash		16s., c.f.
Mahogany, 1s. 6d. to 1s. 10d.	2s. 2d. to 2s. 6d., s.f.	
Walnut, 2s. to 2s. 3d.	2s. 3d. to 2s. 6d. s.f.	

ZINC.

Zinc Sheets (American).....£100, f.o.b., New York.

SCRAP MATERIALS (LONDON PRICES).

ALUMINIUM.

Description.	Price per ton on sale to refiner, delivered at refinery.
Sheet cuttings and rods containing a minimum of 96 per cent. Al.	£160 0 0
Old rolled, etc., containing a minimum of 96 per cent. Al.	120 0 0
Spinnings, punchings, and thin small scrap; also painted and varnished scrap that needs melting, containing a minimum of 96 per cent. Al.	105 0 0
Lump scrap from aero castings and material of equivalent value, containing 87 to 96 per cent. Al	100 0 0
Turnings and Swarf, generally containing 87 to 95 per cent. Al.	87 10 0
Scrap, generally containing 80 to 86 per cent. Al.	80 0 0
Swarf and inferior Swarf, generally containing 80—85 per cent. Al.	70 0 0
All Scrap, containing below 80 per cent. Al., not to exceed	65 0 0
All Swarf, containing below 80 per cent. Al.	50 0 0
Brass, Heavy Selected	£88
Copper, Clean	100
Copper, Brazery	80
Gun-metal, Scrap	118
Lead, no Draft	26
Zinc, Old	40

*Official Prices.
†Includes Parcel Inspection only.
‡Prices include Delivery in the U.K.

THE AIRCRAFT RAG.

The Christmas number of the "Aircraft Rag" is certainly the most ambitious attempt which has yet been made by those responsible for the production of the Aircraft Manufacturing Company's works magazine.

It boasts a well-drawn decorative cover printed in three colours and a coloured plate, both of which are the work of Mr. J. K. Baughan. There is also a series of portrait groups of the employees of the Aircraft Manufacturing Co., Ltd. In the interests of veracity, one sincerely trusts that any German spy who happens to obtain the "Rag" will not be so foolish as to imagine that he can count from the groups the exact number of employees who build aeroplanes for the Aircraft Manufacturing Co. The groups are merely representative of the most important departments.

Among the black and white sketches is one by Mr. F. Milton Cashmore, which obviously is intended to represent Portsmouth harbour. It is entitled "Sea Power," but save for the old "Victory" and the suggestion of a light cruiser in the background, all the vessels which can be seen are of the mercantile type, which suggests that the intention of the artist was to pay a tribute to the work of the Fleet by demonstrating that our commercial sea-power is still going strong. Or perhaps he means that the Mercantile Marine is doing the Navy's work.

There is a particularly good example of Mr. K. J. K.'s series of aeroplane types, representing a super-tractor (Hun type).

Space is too short to criticise the numerous contributions in poetry and prose which are produced, but those who are anxious to see what the Christmas number of the "Aircraft Rag" is really like, cannot do better than send three stamps to the Business Manager, the "Aircraft Rag," c/o the Aircraft Manufacturing Co., Ltd., the Hyde, Hendon, N.W.9.

Owing to the large increase in the size of the special number the price has been raised to twopence for this issue, but it is thoroughly well worth the money.

THE JOY-STICK.

The Christmas number of "The Joy-Stick," the house magazine of A. V. Roe & Co., Ltd., has doubled its size for the occasion, and contains a vast amount of literary and artistic matter of the lighter-than-air-type. The issue contains an augmented instalment of the regular features, such as the Ladies' Page, the Short Stories, Things the Editor Wants to Know, and so forth.

Strangers are invited to apply for a copy to the Editor of "The Joy-stick," c/o A. V. Roe & Co., Ltd., Newton Heath, Manchester, enclosing three 1d. stamps.

STAINING AND POLISHING.

The art of staining and polishing does not come within the scope of the aircraft constructor in a very important degree, but it certainly figures extensively in the manufacture of air-screws, where the question of finish is of extreme importance.

Craftsmen who are concerned with air-screw finishing will, therefore, do well to investigate a handbook on staining and polishing which has been produced by Evans Brothers, Ltd., of London.

This handbook contains a fund of useful information on the subject of staining, varnishing and polishing of all kinds of timber, including formulæ for the preparation of the different materials, and full information as regards application and manipulation.

Although the finishing of air-screws is not specifically dealt with, the treatment of mahogany and walnut is not ignored, and as instructions are given for the elimination of trivial defects in timber, the book may not be without value as a means of conserving the timber supply at this time, when those concerned with aircraft inspection seem afraid to pass an airscrew for service unless it looks pretty.

The price of the book is 3s. 6d. net, and copies can be obtained post free for 3s. 9d. from the William Dawson Publishing Co., Ltd., Rolls House, Breams Buildings, E.C.4.

Firth's
"Speedicut" High-Speed Steel
For turning Tools.

"Speedicut" Milling Cutters
and Drills
For all workshop purposes.

Thos. Firth & Sons Ld.,
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Basil Street, Knightsbridge, S.W.3.

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NON-POISONOUS

AEROPLANE DOPE.

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AS TIGHT  AS A DRUM.

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'Phone—280 Gerrard.

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ARMSTRONG, WHITWORTH
AIRCRAFT WORKS,
NEWCASTLE-UPON-TYNE.

TELEPHONE:- 500 GOSFORTH.
TELEGRAMS:- ARMSTRONG AVIATION, NEWCASTLE-ON-TYNE.

AIRCRAFT FINANCE

CURRENT TOPICS.

The PROVISIONS RELATING to EXCESS PROFITS DUTY A GUIDE TO MAKING THE RETURNS.

Now that the period approaches when a large number of aeroplane companies close their books for the end of the year it becomes necessary to compute what provision to set aside to cover the liability under this head, and the following general rules will be found useful to those interested.

PRINCIPLE OF COMPUTATION.

The profits arising from any trade or business are to be separately determined for Excess Profits Duty, but are to be so determined on the same principles as the profits are or would be determined for Income Tax, subject to certain modifications. (Section 40 of 1915 Act.)

The modifications of general application are as follows:—

ACTUAL PROFITS TO BE TAKEN.

(1). "The profits shall be taken to be the actual profits arising in the accounting period; and the principle of computing profits by reference to any other year or an average of years shall not be followed."

TREATMENT OF INTEREST, ETC., PAID.

(2). "The principle of the Income Tax Acts under which deductions are not allowed for interest on money borrowed for the purpose of the trade or business, or for rent, or royalties, or for other payments Income Tax on which is collected at the source (not being payments of dividends or payments for the distribution of profits), and under which profits or gains arising from lands, tenements, or hereditaments forming part of the assets of the trade or business are excluded shall not be followed."

WEAR AND TEAR, AND RENEWALS.

(3). "Deductions for wear and tear or for any expenditure of a capital nature for renewals, or for the development of the trade or business or otherwise in respect of the trade or business, shall not be allowed, except such as may be allowed under the Income Tax Acts, and if allowed shall be only of such amount as appears to the Commissioners of Inland Revenue to be reasonably and properly attributable to the year or accounting period."

EXCEPTIONAL DEPRECIATION DUE TO THE WAR.

"Exceptional depreciation or obsolescence of assets employed in the trade or business due to the present war, or the necessity in connection with the present war, or providing plant which will not be wanted for the purpose of the trade or business after the termination of the war, or (d) any other special circumstances specified in regulations made by the Treasury."

DEDUCTION OF TAXES PAID.

(4). "Deductions shall not be allowed on account of the liability to pay, or the payment of, Income Tax or Excess Profits Duty, but a deduction shall be allowed (if not otherwise allowed by means of the adoption of the principle of the Income Tax Act) for any sum which has been paid in respect of the profits on account of any Excess Profits Duty or similar duty imposed in any country outside the United Kingdom."

RESTRICTION OF CERTAIN DEDUCTIONS.

(5) (a). "Any deduction allowed for the remuneration of directors, managers, and persons concerned in the management of the trade or business shall not, unless the Commissioners of Inland Revenue, owing to any special circumstances or to the fact that the remuneration of any managers or managing directors depends on the profits of the trade or business, otherwise direct, exceed the sums allowed for those purposes in the last pre-war trade year, or a proportionate part thereof as the case requires, and no deduction shall be allowed in respect of any transaction or operation of any nature, where it appears, or to the extent to which it appears that the transaction or operation has artificially reduced the amount to be taken as the amount of the profits of the trade or business for the purposes of this Act."

RECOVERY OF DUTY FROM DIRECTORS, ETC.

(5) (b). "If as respects any accounting period ended on or after the first day of July, 1915, the Commissioners of Inland Revenue refuse to allow a deduction in respect of any increase in the remuneration of directors of any trade or business, and the taxpayer is required to pay Excess Profits Duty in respect of the disallowed deduction, the taxpayer shall be entitled to recover from any such director the amount which the taxpayer has paid by way of Excess Profits Duty in respect of the increase; but any amount so recoverable shall, unless the Commissioners otherwise direct, be treated as Excess Profits Duty by the director from whom it is recovered and not as Excess Profits Duty paid by the taxpayer."

COMPANIES IN WHICH DIRECTORS (OR MANAGERS) HAVE A CONTROLLING INTEREST.

(5) (c). "Where the pre-war standard of profits is taken to be the percentage standard, or is calculated by reference to the statutory percentage in the case of any trade or business owner or carried on by a company or other body corporate, whose directors have a controlling interest, the Commissioners of Inland Revenue may, if they think fit, as respects any accounting period, including a past accounting period for the purpose of the provisions relating to the statutory percentage and for the purpose of the determination and computation of profits under Part I of the Fourth Schedule to the principal Act, treat the company or body corporate as if it were a firm and not a company or body corporate and the directors or any of them as if they were partners in the firm."

(In the last two paragraphs the expression "directors" includes any managers or persons concerned in the management of the trade or business who are remunerated out of the funds of the trade or business).

INCOME FROM INVESTMENTS TO BE EXCLUDED. (EXCEPT IN CERTAIN CASES.)

(6). "In estimating the profits no account shall be taken of income received from investments except in the case of life assurance business and businesses where the principal business consists of the making of investments." (The 1915 Act contains special provisions regarding cases where account is to be taken of such income.)

CONTRACTS EXTENDING INTO MORE THAN ONE PERIOD.

(7). "In the case of any contract extending beyond the accounting period from the date of its commencement to the completion thereof, and only partially performed in any accounting period, there shall (unless the Commissioners of Inland Revenue, owing to any special circumstances, otherwise direct) be attributed to each of the accounting periods in which such contract was partially performed, such proportion of the entire profits or loss or estimated profits or loss in respect of the complete performance of the contract as shall be properly attributable to such accounting periods respectively, having regard to the extent to which the contract was performed in such periods."

THE GENERAL AVIATION CONTRACTORS, LTD.

(In Liquidation.)

The general notice of the Statutory First Meeting of Creditors and Contributories of this Company, which was held at the Board of Trade offices on the 24th ultimo, under the winding-up order, was duly noticed in these columns. The summary of the statement of affairs, signed by the Official Receiver (the Liquidator of the Company), has now been issued, showing the statement of affairs of the Company as at February 13th, 1917, the date of the winding-up order, the particulars concerning which were submitted by Messrs. W. A. Casson, and W. R. Prentice (directors) on March 27th, 1917.

The preliminary notice foreshadowed a deficit, but the Official Receivor's Report puts a different complexion on the position. The original statement contained as a liability the sum of £848 15s. 7d., which the Liquidator states "is not expected to rank against the assets for dividend." The statement shows

an estimated surplus after meeting liabilities of the Company, subject to cost of liquidation of £1,276 4s. 9d. The contributories' account shows that shares were issued to the amount of £2,100, consequently leaving a deficit on this account of £823 15s. 3d.

The Official Receiver in his observations states :—

"The holding of the Statutory Meetings was delayed in order to obtain from D. L. Santoni (the promoter and ex-managing director), who is engaged on military duties in Italy, information respecting the Company's affairs, and a statement with regard to allegations against him by his co-directors, and in reference to his dealings with the Company's assets and the conduct of its business. This statement has only recently been received from him.

"The goodwill was taken over by the Company at the sum of £1,043. There does not appear to have been much business transacted by the vendor, and the liabilities assumed by the Company exceeded the assets, apart from the goodwill and the questionable value of the agency agreements. These agreements were principally in respect of the Anzani engines and the Deperdussin aeroplanes, both of which resulted in a loss to the Company. The other agencies were small, and the business derived from them had practically no effect on the result of the trading.

"The original capital of the Company, £2,000, was increased in June, 1913, to £5,000 by the creation of a further 1,500 ordinary shares and 1,500 preference shares, all of £1 each. Cash subscriptions to shares were obtained in October, 1912 (£500), April (£1,047), May, 1913 (£100), July, 1916 (£100). The total capital issued amounts to £2,100, consisting of £1,955 ordinary, 1,900 founders' (£95), and £50 preference shares. £255 ordinary and 1,900 founders' (£95) were issued as fully paid to the vendor. From the commencement of its trading the Company carried on a small volume of business as factors and agents for the sale of various articles and commodities used in the aeroplane industry.

"The profits on these, however, appear to have been small, and as it was contemplated to make the Company a purely financial concern, deriving its revenue from the dividends in subsidiary companies in which it held shares, it was decided in December, 1914, to form a company entitled the General Aeronautical Co., Ltd., and to transfer to it the general business of the Company. The Company's operations then consisted of acting as managers on commission of the business of another subsidiary company entitled the British Emaillite Co. (manufacturing a patent varnish for waterproofing the fabric on the wings of aeroplanes) and of financing a group of aeronautical companies formed in Italy, in which the Company held shares.

"From the commencement the Company has carried on business by means of borrowed money. Loans were raised from W. R. Prentice (director); on debentures to the extent of £7,500 and additional sums lent by the debenture-holder without security, and by means of overdrafts at the bank. All these loans have been discharged.

"As the result of the Statutory Meetings of creditors and contributories, held on the 24th ultimo. The Official Receiver remains the liquidator of the Company."—G. A.

Owing to pressure on space, Answers to Correspondents and "Current Prices" are unavoidably omitted.

NEW COMPANIES REGISTERED.

The files of the following new companies registered with the nominal capitals of £5,000 and upwards are now available for inspection at Somerset House :—

BATH AIRCRAFT, LTD.—Dec. 7th, £20,000 in £1 shares (10,000 Participating Pref.).

SWIFT AVIATION CO., LTD.—Dec. 7th, £5,000 in £1 shares. 41-3, Richmond Road, Kingston-on-Thames.

NOTTINGHAM FLYING AND CORRESPONDENCE SCHOOLS, LTD.—Dec. 11th, £20,000 in £1 shares. 44, Parliament Street, Notts.

MORTGAGES AND CHARGES REGISTERED.

SATISFACTIONS.

AIRCRAFT MANUFACTURING CO., LTD., London, S.W.—Satisfactions registered Dec. 4th; £25,000 reg. Oct. 23rd, 1915, and £900 reg. Nov. 4th, 1915.

CLOSING OF TRANSFER BOOKS.

D. NAPIER AND SON, LTD.—Notice is hereby given that the transfer books of the company will be closed from December 17th to December 31st, 1917, both days inclusive, for the purpose of preparing dividend and interest warrants in respect of the Preference shares and Debenture Stock of the company.—By order, F. A. DAVIES, Secretary.

GENERAL ELECTRIC CO., LTD.—Notice is hereby given that the transfer books of the 6 per cent. Cumulative Preference shares will be closed from December 17th to 31st, both days inclusive, for the preparation of warrants for the half-year's dividend, payable on the 31st inst.—By order, HENRY P. WELLS, Registrar.

DIVIDEND NOTICE.

FREDK. SAGE AND CO.—The directors report that, owing to circumstances beyond their control, it has not yet been possible to prepare the accounts as at September 30th last. Although the liabilities for special taxation have not yet been determined, they have resolved to pay on the 20th inst. a dividend of 6 per cent. on the Ordinary shares, out of the profits of the year.

TIMBER CONTROL.

It was announced in the "London Gazette" of Dec. 11th that the Board of Trade, acting under the Defence of the Realm Regulations, had issued an Order prohibiting, without a permit from the Controller of Timber Supplies, the export or removal from Ireland to Great Britain of round or sawn timber of any description grown in Ireland.

AN IMPORTANT APPOINTMENT.

Mr. G. Arthur Wingfield, of Messrs. Wingfield, Blew, and Kenward, has been appointed Chairman of Whitehead Aircraft (1917), Limited.

LONDON TO CONSTANTINOPLE.

In celebration of the recent Admiralty announcement that a Handley Page biplane, fitted with Rolls-Royce engines, flew from London to Constantinople and bombed the "Goeben," a very pleasing lunch was given at the Café Royal on December 13th by Rolls-Royce, Ltd., and Handley Page Ltd., in collaboration. The lunch, though exquisitely served, as befits the Café Royal, and sufficiently voluminous to satisfy the appetite of the intelligent classes, was carefully designed so as not to absorb any part of the food supplies of the British working man, his wife or his family, and Sir Arthur Yapp could have partaken thereof without dissociating himself from his Christian Young Men. No less pleasing than the lunch were the brief speeches thereafter by Mr. Handley Page and Mr. Basil Johnson.

Mr. Page explained, with the aid of a map of Europe, in his best schoolmasterly air, the route taken by the machine, and the operations carried out by it. He did his utmost to make himself understanded of the people as represented by the numerous journalists present, and apparently succeeded admirably as some of the questions asked him at the conclusion of his speech showed distinct signs of intelligence.

The performance of the machine is already familiar to readers of this paper, but it may be worth while to place on record once more that she flew 2,000 miles on purpose to hit the "Goeben," and succeeded admirably. Mr. Page, commenting thereon, remarked that this was the longest range of a military weapon used in history. It is interesting to learn that the time of the flight from the base in the Balkans to Constantinople and back was seven hours, out of which half an hour was spent super-navigating Constantinople. Presumably this information will not now be of use to the enemy—firstly, because the modern machine is an improvement on the one then used, and secondly because the journey back was done with only one engine owing to a stray shot putting the other one out of action.

By way of endeavouring to educate his audience, Mr. Page pointed out that in the next war the first operation of an intelligent belligerent would be to send over an enormous fleet of aeroplanes, carrying troops and artillery, and occupy his enemy's capital within a few minutes of the declaration of war. On the subject of peace flying, he pointed out that in its 2,000 mile journey for war purposes this machine arrived exactly on schedule time at its stopping places, which was evidence that aeroplanes are already fit for commercial use. He further pointed out that anything which brings people close together tends to peace. (N.B.—What about colliding with somebody suddenly in the dark streets these days?) He further produced a very sound argument that whatever makes nations better known to one another makes war less probable. He paid high tributes in the course of his speech to the worth of Rolls-Royce engines, which had contributed so essentially to the success of the Handley Page machines and others.

Mr. Basil Johnson, who spoke after Mr. Page, remarked that the Rolls-Royce had for some time held the world's record for reliability, but he had recently heard that it was also responsible for another make of aeroplane, beating all the world's records for speed on the level and climbing speed. He referred gracefully to the machines, which were the outcome of the combined genius of Mr. Handley Page and Mr. Royce. He pointed out how that, although the first Rolls-Royce motor was produced many years after motors were in general use, it soon won its way to the front, and how in the same way it had come into the very front rank of aero engines, although later in the field than most others.

After these brief speeches some very interesting cinematograph films were shown, illustrating the production of Rolls-Royce engines and the testing of Handley Page biplanes.

Telegrams "Aviation" Norwich. 'Phone No 851 Norwich



BOULTON AND PAUL LTD.

AIRCRAFT WORKS NORWICH

GWYNNES
LIMITED

CONTRACTORS TO H.M. ADMIRALTY AND WAR OFFICE.

SOLE LICENSEES AND MANUFACTURERS IN THE BRITISH EMPIRE OF THE

"CLERGET" PATENT AERO ENGINES.

WORKS & OFFICES: { CRISP ROAD, HAMMERSMITH, W.6. / CHURCH WHARF, CHISWICK, W.4. } LONDON.

TELEPHONES: 1910 HAMMERSMITH (3 lines. 1780 CHISWICK 3 lines).

TELEGRAMS: "GWYNNE, LONDON."

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

(Continued from page 1810.)

Schools of Instn.—Schools of Aerial Gunnery.—Asst. Instr. to Gunnery.—(Graded as an Equipt. Officer, 3rd Cl.), —Lt. G. R. Spencer, Lan. Fus., Spec. Res., Oct. 22nd.

Gen. List.—The following, from R.F.C., to be temp. Sec. Lts. (on prob.), 3rd Cl. Air Mech. J. A. Leonard, 2nd Cl. Air Mech. G. Johnson, 3rd Cl. Air Mech. W. H. P. Parker, Nov. 13th.

Special Reserve of Officers.—Supplementary to Regular Units.—The following Officer is granted hon. rank of Lt.-Col. on appt. as Hon. Comdt. of unit indicated :—Col. G. S. Lord Sydenham, G.C.S.I., G.C.M.G., G.C.I.E., G.B.E., 10th Bn. Kent Vol. R.

War Office, Dec. 17th.

Regular Forces.—Staff.—The following temp. appts. is made at the War Office :—Staff Lt.—Sec. Lt. (Hon. Capt.) A. V. Hambro, T.F., Res., from an Equipt. Officer, 2nd Cl., R.F.C., Dec. 1st.

Establishments.—R.F.C.—Mil. Wing.—Wing Comdrs.—From Sqdn. Comdrs., and to be temp. Lt.-Cols. whilst so empld. —Capt. (temp. Maj.) F. H. Jenkins, M.C., Spec. Res., Sept. 15th. Maj. L. Jenkins, M.C., R.G.A., T.F., Nov. 22nd. Maj. J. R. C. Heathcote, Cam'n Highrs., Nov. 25th.

Flt. Comdrs.—From Flying Officers, and to be temp. Capts. whilst so empld. :—Temp. Lt. R. L. Stevenson, Gen. List; temp. Sec. Lt. (temp. Lt.) F. J. Woollard, Gen. List, Dec. 4th.

Equipt. Officers, 1st Cl.—Capt. L. S. B. Hull, R.W. Surr. R., T.F., from 2nd Cl., Oct. 22nd. From 2nd Cl., and to be temp. Capts. whilst so empld. :—Lt. L. H. B. Cosway, Spec. Res.; Sec. Lts. (temp. Lts.), Spec. Res. :—T. G. MacKenzie, A. C. Smith, R. Donald, J. D. Campion, Dec. 1st. Temp. Sec. Lt. (temp. Lt.) J. P. Angell, Gen. List.

Schools of Mil. Aeronautics.—Asst. Instrs.—(Graded as Equipt. Officers, 2nd Cl.)—Temp. Sec. Lt. P. C. Hollingsworth, M.C., Gen. List, a Flying Officer (Obsr.), and to be temp. Lt. whilst so empld., Aug. 29th. Appt. of Lt. A. Hollingworth, Canadian Local Forces, notified in "Gazette" of Nov. 27th is cancelled.

Schools of Instrn.—Wireless School.—Comdt.—(Graded as a Depot Comdr.).—Capt. (temp. Maj.) J. B. Bowen, Yeo., T.F., from a Comdr. (graded as a Park Comdr.), School of Wireless Operators, and to be temp. Lt.-Col. whilst so empld., Oct. 12th.

Balloon Schools of Instrn.—Comdt.—Graded as a Sqdn. Comdr.—Lt. (temp. Capt.) G. S. Sansom, M.C., Spec. Res., a Balloon Co. Comdr. (graded as a Flt. Comdr.), and to be temp. Maj. whilst so empld., vice temp. Maj. A. H. Parker, M.C., Gen. List, Nov. 24th.

School of Inspn.—Comdt.—Graded as a Park Comdr.—Sec. Lt. (temp. Capt.) C. H. Stevens, Spec. Res., an Equipt. Officer, 1st Cl., and to be temp. Maj. whilst so empld. Nov. 21st.

School of Technical Training.—Chief Instr. (Technical Section).—Graded as a Park Comdr.—Lt. (temp. Maj.) V. W. Eyre, Spec. Res., from a Special Appt. (graded as a Park Comdr.), and to retain his temp. rank whilst so empld., Nov. 21st.

The King has been pleased to confer the following rewards for gallantry and distinguished service in the Field. The acts of gallantry for which the decorations have been awarded will be announced in the "London Gazette" as early as practicable :—

A Bar to the Military Cross.

Temp. Sec. Lt. M. B. Frew, M.C., Gen. List and R.F.C. (M.C. gazetted Oct. 18th, 1917).
Lt. R. A. Maybery, M.C., Lrs. and R.F.C. (M.C. gazetted Sept. 26th, 1917).
Sec. Lt. L. A. Powell, M.C., Gen. List and R.F.C. (M.C. gazetted Sept. 26th, 1917).

The Military Cross.

Lt. (temp. Capt.) J. M. Burd, R.F.A. and R.F.C.
Lt. E. W. Clarke, R.F.C., Spec. Res.
Temp. Sec. Lt. W. Durrand, Gen. List, and R.F.C.
Temp. Capt. H. O. W. Hill, R.F.C.
Sec. Lt. D'A. F. Hilton, R.F.C., Spec. Res.
Sec. Lt. H. H. Maddocks, Gen. List and R.F.C.
Capt. J. J. L. Williams, Yeo., attd. R.F.C. (Egypt).

FROM THE COURT CIRCULAR.

Buckingham Palace, Dec. 12th.

The following officer had the honour of being received by The King this morning, when His Majesty invested him with the Insignia of Companion of the Order into which he has been admitted :—

The Distinguished Service Order and the Distinguished Service Cross.

Flt. Lt. Raymond Collishaw, R.N.A.S.

The King then conferred decorations as follows :—

The Distinguished Service Cross.

Sqdn. Comdr. Ernest Norton, R.N.A.S.
Flt. Comdr. Charles Bartlett, R.N.A.S.
Flt. Comdr. Albert Enstone, R.N.A.S.
Flt. Lt. Horace Wigglesworth, R.N.A.S.
Flt. Lt. Valentine Sieveking, R.N.A.S.
Obsr. Lt. Cyril Chapman, R.N.A.S.
Flt. Lt. Wilfred Curtis, R.N.A.S.

The Military Cross.

Capt. Richard Duncan, C.M.R. and R.F.C.
Capt. Robert Scudamore, R.F.C.
Capt. Frederick Selous, Royal West Surrey and R.F.C.
Capt. William Smith, Lond. R. and R.F.C.
Capt. Ernest Williams, R.F.C.
Capt. Henry Williams, R.F.C.
Lt. Laurence Allen, Royal Warwick. Regt., attd. R.F.C.
Sec. Lt. William Lauder, R.F.C.
Sec. Lt. Langharne Morgan, Welsh Regt. and R.F.C.
Sec. Lt. Charles Kingsford-Smith, R.F.C.

Buckingham Palace, Dec. 14th.

The Lord Rothermere (President of the Air Board) and Sir William Weir (Director-General of Aircraft Production) had the honour of being received by the King this morning.

NAVAL.

The following appointments have been made in the Royal Naval Air Service :—

Dec. 11th.—Obsr. Lt. (Temp.) (late Lt., Temp., R.N.V.R.).—W. C. A. Meade, temp. commission as Lt. (R.N.V.R.) reissued with original seny. of Oct. 11th, 1914.

Warrt. Officer (Temp.), 2nd Gr.—T. Martin, granted temp. commission as Lt. (R.N.V.R.), seny. Dec. 6th.

Temp. commissions as Lt. (R.N.V.R.) have been granted to the following, seny. as stated :—E. G. Batt, Dec. 6th; C. W. Stamper, Dec. 17th; and J. A. Gye, Dec. 19th.

Dec. 12th.—Flt. Sub-Lts. (Temp.).—N. Grabowsky and G. L. Lowis, promoted to Flt. Lts. (temp.), seny. Nov. 15th.

Warrt. Officer, 2nd Gr. (Temp.).—H. T. Foxen, promoted to Lt., R.N.V.R. (temp.), seny. Dec. 9th.

Dec. 13th.—Lt. (R.N.V.R. Temp.).—G. Hazelton, promoted to rank of Lt.-Comdr. (R.N.V.R. Temp.), seny. Dec. 10th.

Mr. J. Hibbert has been granted temp. commn. as Lt. seny. Dec. 12th.

Dec. 14th.—Lt.-Comdr. R.N.V.R. (Temp.).—W. F. Vernon, entered as Sqdn.-Comdr. (temp.), seny. Dec. 10th.

Dec. 17th.—Mr. A. G. Buckham granted temp. commission as Lt. (R.N.V.R.), seny, Dec. 9th.

Admiralty Communiqués.

Dec. 11th.—During Dec. 10th several patrols were carried out by naval aircraft, in the course of which three of our machines attacked and drove back five enemy scouts and seven large seaplanes. Two enemy machines were also destroyed, and two kite balloons attacked.

Enemy trenches and an active anti-aircraft battery were attacked by machine-gun fire.

At noon a bombing raid was carried out on Varssenaere aerodrome (south-west of Bruges), many bombs being dropped. Two direct hits are reported, and bombs were observed to drop close to and among sheds in aerodrome.

All our machines have returned safely.

Dec. 12th.—During the night of December 10th-11th, naval aircraft carried out a bombing raid on Oostacker aerodrome (north-east of Ghent) and Bruges Docks.

Many tons of bombs were dropped on both objectives. On the former, owing to poor visibility, results were difficult to observe, but at the latter good shooting was made and a fire started.

All our machines returned safely.

Dec. 13th.—On the night of Dec. 11th a bombing raid was made by naval aircraft on Bruges Docks. Visibility was bad, with low-lying clouds. One of our machines is missing.

The usual fighter patrols were carried out; one enemy aircraft was driven down out of control and observed to crash.

Dec. 16th.—A British airship of non-rigid type, with a crew of five, which proceeded on patrol on December 11th from an East Coast base, has not returned, and from information available it is believed that she has been destroyed by a hostile seaplane in the southern part of the North Sea.

A second airship of similar type was forced to descend in Holland through engine failure on Dec. 12th.

The Casualty List.

Reported Dec. 13th.

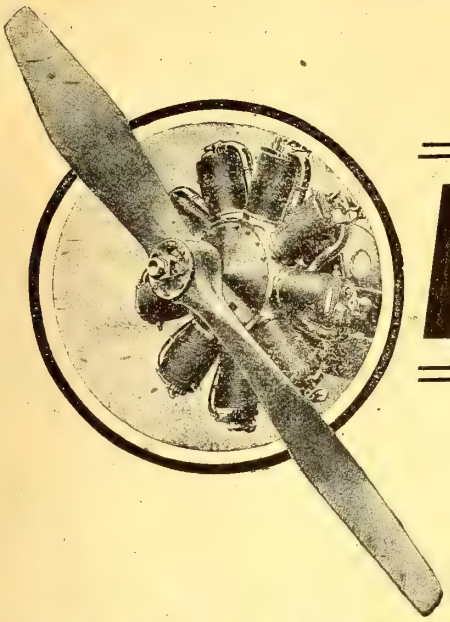
Drowned.—Sprules, F. T., Aircraftsman, 2nd Cl., F37032.

Reported Dec. 14th.

Died of Injuries.—Douglass, Actg. Flt. Comdr. P. C. D., R.N.
Missing (Feared Drowned).—Larter, Flt. Sub-Lt. N. I., R.N.
Accidentally Injured.—Tyndale-Biscoe, Flt. Lt. H. L'E., R.N.
Pope, Prob. Flt. Officer E. A. J., R.N.
Slightly Injured.—Hinsley, Obsr. Sub-Lt. W., R.N.

Reported Dec. 17th.

Accidentally Killed.—Beaie, Actg. Lt. E. E., R.N.
Moran, Flt. Sub-Lt. J. L., R.N.
Missing.—Dixon, Flt. Lt. J. F., D.S.C., R.N.
Hall, Flt. Lt. H., R.N.
Clark, Flt. Sub-Lt. J. G., R.N.



AERO ENGINES

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

W. H. ALLEN, SON & CO. LTD.

QUEEN'S ENGINEERING WORKS, BEDFORD,

ENGLAND.

FIRST AID CABINETS.



By a Home Office order dated October 12th, 1917, factories in the following Classes :—

BLAST FURNACES, FOUNDRIES,
COPPER MILLS, METAL WORKS,
IRON MILLS,

are to be equipped with First Aid Cabinets. In factories where 500 or more workers are employed an Ambulance Room must also be provided.

By arrangement with Mr. C. F. Thackray, of Leeds, we can furnish efficient First Aid Cabinets, complete with the necessary Sterilized Dressings, Eye-drops, etc., as required by the order.

Should an Ambulance Room be necessary we can place at customers' disposal Mr. Thackray's considerable experience in this work.

Advice on location and constructional features can be given, plans submitted, and an up-to-date equipment furnished.

Alfred Herbert, Ltd.,
COVENTRY.

LONDON: 64, Victoria Street, S.W.1. GLASGOW: 348, Argyle Street. MANCHESTER: 30, Cross Street. NEWCASTLE: New Market Street. LEEDS: Atlas Chambers, King Street. SHEFFIELD: Queen Street Chambers, Queen Street BIRMINGHAM: Exchange Buildings, New Street. BRISTOL: 11, Hawkesbury Road, Fishponds. CALCUTTA: 13, British India Street. YOKOHAMA: 14, Yamashita-cho. TOKIO: 13, Yamashitacho, Kyobashiku. OSAKA: 98, Sonesaki Kami. NEW YORK: 54, Dey Street.

AGENTS FOR FRANCE: Societe Anonyme, Alfred Herbert, 47, Boulevard de Magenta, Paris.

AGENTS FOR ITALY: Societa Anonima Italiana, Alfred Herbert, 42, Via Cajazzo, Milan.

Accidentally Injured.—Thwaite, Prob. Flt. Officer M. F., R.N.
Castle-Smith, Prob. Flt. Officer S., R.N

PERSONAL NOTICES.

Deaths.

BLACK.—News has been received that Flt. Lt. Norman Black, R.N., who was officially reported missing on Oct. 11th, succumbed to wounds on the following day. He was educated at Christ's Hospital, where he was captain of the school.

DOUGLASS.—Flt. Comdr. Percy C. D. Douglass, R.N., who died as the result of injuries received in an aeroplane accident, was elder son of the late Mr. W. T. Douglass and of Mrs. Douglass, of Ladbroke Terrace. He was 31 years of age, and had seniority of April 1st, 1916.

Marriages.

BLANCHARD—HOLMES.—On Dec. 11th, at St. John's Church, Blackheath, Roy Godfrey Blanchard, R.N.A.S., son of Mr. and Mrs. George Charles Blanchard, of New Cross, was married to Dorothy, eldest daughter of Mr. and Mrs. James Ward Holmes, of Blackheath, by the Rev. Howard J. H. Truscott, Vicar of St. Catherine's, Hatcham.

BROWN—NEWHAM.—On Dec. 5th, at St. Mary's, Hanwell, William Ernest Brown, R.N.A.S., was married to Ethel, youngest daughter of Mr. W. E. H. Newham, of Golders Green.

CLARKE—SANDYS.—On Dec. 8th, at St. John's Church, Brooklands, Flt. Sub-Lt. William Edward Clarke, R.N., eldest son of Mr. and Mrs. T. E. Clarke, of Harwood Lodge, Bolton, and Challan Hall, Silverdale, was married to Edith Isobel Congreve (Kate), second daughter of the late Col. F. R. Sandys (late 4th King's Own Royal Regt.) and of Mrs. Sandys, of Raglan House, Brooklands, Cheshire, by the Right Rev. the Dean (Bishop Welldon), assisted by the Rev. G. E. Rees, M.A., Vicar of Harwood.

MILITARY.

G.H.Q. Communiqués.

Dec. 11th, 11.10 a.m.—There was unusual aerial and artillery activity yesterday on both sides on the British front, particularly in the sectors south of the River Scarpe and north of the River Lys.

10.5 p.m.—On the 10th instant the weather became suitable for flying, and great activity took place in the air on both sides.

The enemy's machines were particularly active west of Cambrai, making repeated attacks on our artillery machines. Our aeroplanes dropped many bombs, and fired many rounds from their machine-guns on the enemy's villages, hutments, and trenches. In the evening hostile machines dropped bombs in our Army areas, but only slight damage resulted.

During the day two German aeroplanes were brought down in air fighting, and two others were driven down out of control. A hostile balloon was also brought down, and another German aeroplane was shot down by our infantry.

Three of our aeroplanes are missing.

At 11 o'clock on the 11th instant our machines left the aerodromes in fine weather to bomb certain factories in Germany. On reaching the area of their objectives, our pilots found their target obscured by clouds, but seeing a clear gap farther north-east they continued their flight in that direction.

Through the gap in the clouds they recognised the large railway junction north-east of Pirmasels (? Pirmasens), and dropped their bombs upon it. The closing of the gap in the clouds prevented observation of the results.

Although the whole sky was covered by low clouds during the return journey, all our pilots succeeded in reaching the aerodrome safely.

Dec. 13th, 9.52 p.m.—On the 12th inst., in spite of low clouds and mist, a great many of our aeroplanes were in the air.

The enemy's troops were engaged with machine-gun fire during their attack on our positions at Bullecourt, bombs were dropped, and low reconnaissances carried out.

There was much air fighting, in which a Gotha aeroplane and one other German machine were brought down, and three other hostile machines driven down out of control. Another hostile machine was shot down in our lines by anti-aircraft gun fire.

All our aeroplanes returned.

Dec. 14th, 9.35 p.m.—On the 13th inst. one German aeroplane was shot down by our infantry.

There is nothing further of special interest to report concerning aerial activity on either side.

Dec. 16th, 9.39 p.m.—Although the weather was fine on the 15th inst., a very high wind and ground mist interfered with reconnaissance and artillery work.

During the day many rounds were fired from the air into the enemy's trenches, and bombs were dropped by our aeroplanes on numerous targets, including two positions of long-range guns south-west of Lille. These gun positions were again bombed by us during the night.

Enemy aircraft activity was considerable all day, and several fights took place. Three hostile machines were brought down, and two driven down out of control.

None of our aeroplanes are missing.

War Office Communiqués.

Dec. 12th.—The G.O.C. the British Forces in Palestine reports:—

Our aeroplanes have twice bombed Rupel, on the Upper Struma, causing damage to buildings and stores. On Dec. 10th an enemy machine was brought down out of control near Nikolic (north of Lake Doiran).

Dec. 12th.—The G.O.C. the British Forces in Palestine reports:—

Our aeroplanes bombed troops and transport about Bireh with good results. [Bireh, the ancient Beeroth, is nine miles north of Jerusalem on the Shechem road.]

Dec. 15th.—The G.O.C. the British Forces in Palestine reports:—

Since Dec. 12th three enemy aeroplanes have been destroyed, and one has been driven down out of control.

Dec. 16th.—The G.O.C. the British Forces in Palestine reports:—

Our aeroplanes dropped 56 bombs on motor-boat sheds and on troops at the mouth of the Jordan with good effect, obtaining 24 hits.

The Casualty List.

Reported Dec. 12th.

Killed.—Desborough, Sec. Lt. L. V., R.F.A. and R.F.C.
Dickie, Sec. Lt. E. G., R.F.C.
Rhude, Sec. Lt. F. W., R.F.C.
Rice, Sec. Lt. A. H., R.F.C.
Rowden, Lt. R. C. G., R.F.C.

Died of Wounds.—McLeod, Sec. Lt. E. G., R.F.C.
Pryke, Sec. Lt. E., R.F.C.

Wounded.—Aldridge, Sec. Lt. A. E. R., R.F.C.
Coop, Sec. Lt. R., R.F.C.
Fraser, Sec. Lt. W. T., R.F.A., attd. R.F.C.
Gilham, Sec. Lt. C., R.F.C.
Nicholls, Lt. L. B., A.S.C., attd. R.F.C.
Rodney, Capt. Hon. J. H. B., M.C., Rif. Brig., attd. R.F.C.
Townsend, Lt. H., Durh. L.I., attd. R.F.C.

Missing.—Campbell, Sec. Lt. C. B., R.F.C.
Campbell, Sec. Lt. I. D., R.F.C.
Cawson, Sec. Lt. G. A., R.F.C.
Clark, Sec. Lt. E. V., R.F.C.
Dodds, Lt. A., N. Staff. R., attd. R.F.C.
Dusgate, Sec. Lt. R. E., R.F.C.
King, Capt. D. B., R.F.C.
Macgregor, Lt. D. A. D. S., R.F.C.
Timmis, Sec. Lt. L. W., R.F.C.

Previously reported Missing, now reported Prisoners in German Hands.—Goodbehere, Sec. Lt. P., Manch. R., attd. R.F.C.
Kemp, Sec. Lt. N. H., R.F.C.
Patch, Capt. H. S., Lan. R., attd. R.F.C.

Reported, Dec. 13th.

Wounded.—Glynne, Sec. Lt. A., R.F.C.
Goodfellow, Sec. Lt. C. S., M.C., R.F.C.
Kinnear, Sec. Lt. A. M., R.F.C.
Shaw, Sec. Lt. E. L., S. Staff. R. attd. R.F.C.
Tiptaft, Sec. Lt. C. P., M.C., Conn. R., attd. R.F.C.

Missing.—Hyde, Sec. Lt. C., R.G.A., attd. R.F.C.
Mackenzie, Sec. Lt. J., R.F.C.

Previously reported Prisoners, now reported Wounded and Prisoners in German Hands.—Mumford, Lt. G. W., A.S.C., attd. R.F.C.
Smith. Sec. Lt. W. C., R.F.C.
Taylor, Sec. Lt. N. J., R.F.C.

Prisoner in Turkish Hands.—Blake, Lt. J. W., K.R.R.C., attd. R.F.C.

Previously reported Missing, now reported Prisoners in German Hands.—Smith, Sec. Lt. R. M., R.F.C.
Smith, Sec. Lt. E. A. L. F., R.F.C.

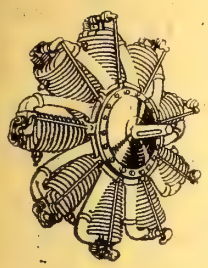
Canadian Force.—Missing.—Kert, Lt. L., Rly. Troops, attd. R.F.C.
Towsend, Capt. R. T., A.P.C., attd. R.F.C.

Reported Dec. 14th.

Wounded.—Gran, Capt. T., R.F.C.
Hepple, Sec. Lt. T. R., R.F.C.

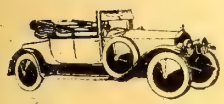
Missing.—Glendinning, Sec. Lt. J. G., Mon. R., attd. R.F.C.
Hoyles, Sec. Lt. A. H. C., H.L.I., attd R.F.C.
Johnston, Capt. J. E., Ches. R., attd. R.F.C.
Luchford, Capt. H. G. E., M.C., R.F.C.
Miller, Sec. Lt. D., R.F.C.
Orrell, Sec. Lt. J. T., R.F.C.
Petersen, Sec. Lt. G. G. W., R.F.C.
Spiro, Sec. Lt. S. G., R.F.C.

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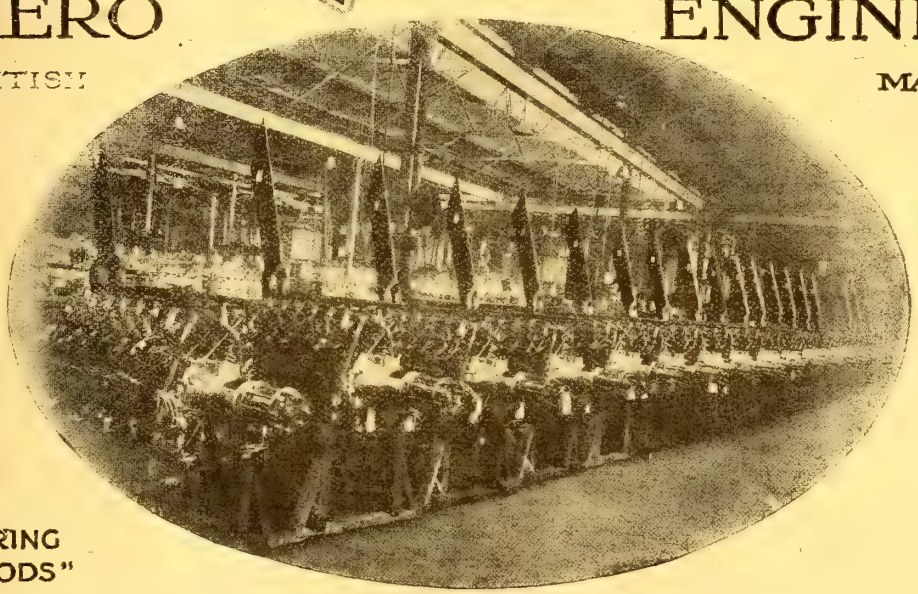
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Indian Force.—Correction.—Missing.—Dalley, Sec. Lt. J. P., I.A.R.O., attd. R.F.C., should read Dalley, Lt. J. P., I.A.R.O., attd. R.F.C.

Reported Dec. 15th.

Killed.—Biner, Sec. Lt. F. A., R.F.C.
Coddington, Sec. Lt. C. E., L'pool R., attd. R.F.C.
Stacey, Sec. Lt. J. H., E. Surr. R., attd. R.F.C.
Titchener, Lt. L., R. Lanc. R., attd. R.F.C.
Wounded.—Linsley, Lt. R. J. H., M.C., R.F.C.
Rowles, Lt. S. W., A.S.C., attd. R.F.C.
Missing.—Bevan, Sec. Lt. W., R.F.C.
Gloster, Sec. Lt. F. B., A.S.C., attd. R.F.C.
New Zealand Force.—Wounded.—Browne, Lt. A., Inf., attd. R.F.C.

Reported Dec. 17th.

Killed.—Clayphan, Sec. Lt. G. A., R.F.C.
Whyte, Sec. Lt. G. H., R.F.C.
Wounded.—Brokensha, Capt. H., R.E. and R.F.C.
Galer, Sec. Lt. H. E., R.F.A., attd. R.F.C.
Parkes, Sec. Lt. N. E., R.F.C.
Missing.—Goodchap, Lt. A. F., Glouc. R., attd. R.F.C.
Middleton, Sec. Lt. A. H., R. Muns. Fus., attd. R.F.C.

Reported Dec. 18th.

Killed.—Carter, Sec. Lt. G. A., R.F.C.
Cawson, Sec. Lt. G. A., R.F.C.
Nunnerley, Sec. Lt. W. K., R.F.C.
Winnicot, Sec. Lt. R., M.C., Devon. R., attd. R.F.C.
Previously reported Missing, now reported Killed.—De Rochie, Sec. Lt. C. M., R.F.C.
Oliver, Sec. Lt. S. J., R.F.C.
Skeffington, Sec. Lt. H. N. S., R.F.C.
Died of Wounds.—Young, Sec. Lt. H. V., R.F.C.
Wounded.—Couper, Sec. Lt. W. A., R.F.C.
Missing.—Kendall, Sec. Lt. S., R.F.C.
Nixon, Sec. Lt. L. G., R.F.C.
Ogden, Sec. Lt. C. E., R.F.C.
Rennells-Moss, Sec. Lt. C. G. V., R.F.C.
Previously reported Missing, now reported Prisoners in German Hands.—Fleming, Sec. Lt. J. A. M., R.F.C.
Hills, Sec. Lt. O. M., M.C., R.F.C.
Jones, Sec. Lt. W. H., R.F.C.
Kingsland, Sec. Lt. W. R., R.F.C.
McLaurin, Sec. Lt. D., R.F.C.
Canadian Force.—Accidentally Killed.—Van Buskirk, Lt. L. E., Cav., attd. R.F.C.
Wounded.—Dexter, Lt. W. E., B.C. Regt., attd. R.F.C.
Harmon, Lt. B. W., M.C., B.C. Regt., attd. R.F.C.
Sattin, Lt. A. W., Ont. Regt., attd. R.F.C.

* * *

Casualties among Warrant Officers, N.C.O.'s, and Men. The Dates are those of the Official List.

Killed.

Dec. 3rd.—R.F.C.—Benden 30860 2nd Cl. Air Mech. F., Bristol; McNeill 106015 D., Stockbridge, Edinburgh.

Died of Wounds.

Dec. 6th.—R.F.C.—Davey 44685 2nd Cl. Air Mech. E. J., Hampstead, N.W.

Wounded.

Dec. 3rd.—R.F.C.—Blades 24426 1st Cl. Air Mech. C., Hornby, Bédale; Ford 43069 2nd Cl. Air Mech. A. W., Stoke Newington, N.; Hardy 15076 1st Cl. Air Mech. H., Leicester; Hellier 65044 2nd Cl. Air Mech. P. V., Cricklewood, N.W.; Mann 106034 3rd Cl. Air Mech. H., Barnsley; Millar 27453 2nd Cl. Air Mech. R., Walton, Norfolk.

Dec. 6th.—Andrew 4919 1st Cl. Air Mech. H. W., Willesden Green, N.W.; Gretton 9430 2nd Cl. Air Mech. G. C., West Hartlepool; Newson 43984 2nd Cl. Air Mech. F. S., Catford, S.E.; Platel 25362 1st Cl. Air Mech. S. H., Brixton Hill, S.W.; Simmonds 8685 1st Cl. Air Mech. E. H., Putney, S.W.; Yates 46481 2nd Cl. Air Mech. G., Edinburgh

Previously reported Wounded, now reported not Wounded.

Dec. 5th.—R.F.C.—Beal 47459 2nd Cl. Air Mech. C. G., Farnham.

Dec. 6th.—Woodhouse 37316 1st Cl. Air Mech. A. J., Hereford.

Missing.

Dec. 3rd.—R.F.C.—Postons 29138 1st Cl. Air Mech. H. L., Birmingham.

Prisoners of War in German Hands.

Dec. 7th.—R.F.C.—Nicol 103362 2nd Cl. Air Mech. W., Forres; Pollitt 88145 1st Cl. Air Mech. F., Pendleton.

Previously Missing, now reported Died as Prisoners of War in Turkish Hands.

Dec. 4th.—R.F.C.—Pass 3317 2nd Cl. Air Mech. W. C., Prince's Park.

PERSONAL NOTICES.

Deaths.

DARRINGTON.—Lt. Harold Edgar Darrington, Middx. R., and R.F.C., who died on Nov. 20th of wounds received on the same day, while flying on the Western Front, was the only son of Mr. and Mrs. Reginald E. A. Darrington, "Lakewood," 15, Richmond Road, Wanstead, N.E. He was 24 years of age.

DESBOROUGH.—Lt. L. Vernon Desborough, R.F.A., attd. R.F.C., who was killed in action on Nov. 30th, was 22 years of age, and was promoted to the rank of lieutenant in July of this year.

HOLROYDE.—Sec. Lt. J. S. Holroyde, E. Yorkshire R. and R.F.C., who is officially reported killed, having been reported missing since May 10th, was the only child of Mr. and Mrs. Holroyde, of Bromley, Kent. He was educated at Tonbridge and Dulwich, and at the beginning of the war, at the age of 16, he joined the Kent Motor Cyclists, and transferred to the London Scottish. Later, he entered Sandhurst, and obtained a commission in the East Yorkshire R., being attached to the Royal Flying Corps. He went to the front last March.

HUNTER.—Capt. Thomas Vicar Hunter, Rif. Brig., attd. R.F.C., who was killed on Dec. 5th, aged 20, was the younger of two sons of Mr. H. C. V. and the Hon. Mrs. Hunter, of Abermarlais Park, Llangadock, Carmarthenshire, and Kilbourne Hall, Derby. He was educated at Ladycross (Mr. Roper's) and at Eton (Mr. G. H. K. Marten's house). He left Eton at the outbreak of war for Sandhurst, and received his commission in the Rif. Brig. in Dec., 1914. In Jan., 1915, he met with a severe accident, which resulted, after many months in hospital, in the loss of a leg. He worked for some time at the War Office, and was eventually passed fit for home service and rejoined his regiment in Nov. 1915. Early this year he joined the R.F.C., and went to the front in June as a pilot, being promoted Flt. Comdr. in Oct. He was gazetted Capt. in the Rif. Brig. on Dec. 14th.

JENKINS.—Lt. Ralph Conway Jenkins, R.F.C., whose death was announced last week, entered the Army on the outbreak of war at the age of 18, in the Garrison Artillery, afterwards being transferred to the Anti-Aircraft Defence. After a time he was offered the post of dispatch rider at Harwich and Felixstowe. From there he went to the front, and saw active service for 12 months, the latter four months as aerial observer, with a commission as second lieutenant in the R.F.C. He then returned to England, and gaining his wings at Gosport was made an instructor. He was a brother of Brig.-Gen. Conway Jenkins, R.F.C.

LIARDET.—Lt. Frederick Charles Evelyn, R.F.C., who died on Dec. 13th at Beech Park, Newton Abbot, was the husband of Kathleen Norah, and eldest son of the late Wilbraham John Liardet and Mrs. Liardet, of Melbourne, Australia.

MACGREGOR.—Lt. Donald A. D. I. Macgregor, R.F.C., who was killed in action on Nov. 30th, was the elder son of the late John Macgregor, Leith, and ward of Donald Ross (G. Ricordi and Co.), Balnagowan, Finchley Road, Golder's Green, N.W. He was 22 years of age.

MIERS.—Capt. Richard Henry Probyn Miers, R.F.C., late Temporary Major, Yeomanry, who was killed while flying on Dec. 12th, was son of Mr. and Mrs. Henry Miers, of Ynys-penllwch, Clydach, Glamorganshire, and Philbeach Gardens. He was born in 1873, and married, in 1906, Vera Enid, daughter of Mr. John Spencer Bridges Todd. He had his captaincy in the Yeomanry in September, 1914, and became a flying officer in the R.F.C. in July of this year. Capt. Miers served in the ranks of the Imperial Yeomanry in the Boer War.

NOSWORTHY.—Lt. Claude William Michelin, R.F.A., attd. R.F.C., who died on Dec. 6th of wounds received in air combat on the same day, was the third son of Mr. and Mrs. Richard Nosworthy, of Jamaica. He was 22 years of age.

Born in 1895, he was educated at Exeter School and at McGill University, Montreal, where he was studying engineering at the outbreak of the war. He returned to England, and obtained a commission in the R.F.A. in September, 1914. He received his promotion three months later; in November, 1915, he became adjutant to his brigade, and in October, 1916, he was gazetted to the Regular Army. He fought with distinction through the battles of Loos and the Somme, possessing the full confidence of his commanding officer, who reported most favourably on him. In February, 1917, he was attached to XI. Corps H.A., and in September he joined the R.F.C., receiving his fatal wound in aerial combat within one week after his return to France.

NUNNERLEY.—Lt. Willson Kenwick Nunnerley, R.F.C., who was killed in aerial combat on December 5th whilst engaged on artillery registration, was the youngest son of Mr. and Mrs. William Nunnerley, of Kenwick, Ellesmere, Shropshire. He was nineteen years of age and received his "wings" in August last.

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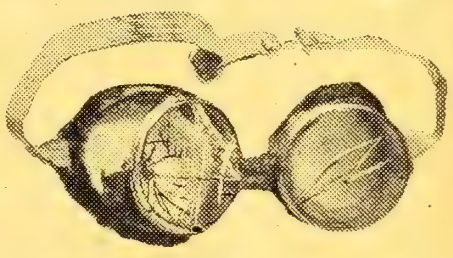
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PEARSON.—Sec. Lt. James Alan Pearson, R.F.C., who was killed on Dec. 9th, while flying, was 18 years of age, and the only son of Mrs. Goodfellow, Grange Road, Bushey, Herts, and of the late James Pearson, of Brampton Manor, Chesterfield. He was gazetted to the Royal Flying Corps in August, 1917.

Engagements.

ALLEN—THOMAS.—An engagement is announced between Capt. Gerald Allen, Connaught Rangers (Maj., R.F.C.), son of Mr. Robert Allen, of Coolgrena, Rushbrook, County Cork, and Mina, only daughter of Brig.-Gen. Sir Owen and Lady Thomas, of Anglesey.

BRYANT—TRURAN.—An engagement is announced between Sec. Lt. Frank Venning Bryant, R.F.C., second son of Mr. and Mrs. Edmund Bryant, of East London, South Africa, and Winifred Mary, only daughter of Mr. and Mrs. J. Jameson Truran, of Harrow-on-the-Hill.

CARTER-LAMBDEN.—The engagement is announced between Mr. C. K. A. Carter, R.F.C., son of the late Major Car-

Marriages.

BANNISTER—MINOGUE.—On Dec. 16th, at St. Mary Abbot's, Kensington, Sec. Lt. T. H. C. Bannister, R.F.C., son of the late Thomas Bannister, J.P., was married to Annie, widow of the late Colonel James Minogue, W. York Regt., daughter of the late Hilton Philipson, J.P., and Foundress and Commandant of Mornington Lodge War Hospital for Officers.

BUDGEN—HEANE.—The marriage between Capt. W. D. Budgen, Leinster Regt., attd. R.F.C., and Evelyn Bridgett, youngest daughter of the late R. N. Heane and Mrs. Heane, of Newport, Salop, took place at St. Nicholas Church, Newport, on Dec. 19th (to-day).

CUSHION—KENYON.—On Dec. 8th, at St. Mark's Church, Hamilton Terrace, Maida Vale, Capt. W. Boston Cushion, R.F.C., eldest son of Mr. and Mrs. W. Cushion, Surlingham, was married to Hetty, only daughter of the late D. S. Kenyon and Mrs. Kenyon, St. John's Wood, London.

LAXTON—CAMERON.—On Dec. 11th (by licence), at All Saints', Hatcham, Lt. Harry Laxton, Yorks Regt., attd. R.F.C. eldest son of Mr. and Mrs. Ben Laxton, of Peterborough, was married to Jeannie Winifred, younger daughter of Mr. and Mrs. R. W. Cameron, of Queen's Road, New Cross Gate, by the Rev. S H. Tucker.

Births.

CUMMING.—On Dec. 14th, at Thames Cottage, Walton-on-Thames, to Eileen Norah, wife of Captain Howard Cumming, R.F.C.—a daughter.

CULLEN.—On Dec. 15th, at 4, Belgrave Mansions, St. John's Wood, N.W., to "Gwen" and Walter D. Cullen, East Surreys and R.F.C.—a son (Charles).

LEAGE.—On Dec. 8th, at 13, Prince's Gate, S.W., the wife of Lt. H. H. Leage, R.F.C., of a son.

MAHONY-JONES.—On Dec. 13th, at 138, Thorpe Road, Norwich, to Alice, wife of the late Capt. G. J. Mahony-Jones, R.F.C., a daughter.

The special correspondent of the "Times," writing from France on Dec. 13th, says of the recent fighting near Bullecourt:

Though still fine, the weather is sunless and the air too thick for good observation, but our aeroplanes are indefatigable, and took an active part in yesterday's trench fighting. One pilot, in particular, had to return three times with his aeroplane crippled by rifle or machine-gun fire, and at last went out with a fourth machine. Each time he took bombs and dropped them wherever he thought they would do most good. Flying within 50 feet of the ground, he completely cleared one trench of the enemy infantry with his machine-gun.

* * *

Special arrangements for training youths between 17½ and 18 years of age for entrance into the Royal Flying Corps are being made by the East London College (University of London).

The course, which commences on January 15th, will extend over a period of six months. It will include engineering, science, and meteorological subjects, and it is hoped that students will by the end of that time be thoroughly prepared to enter upon the regular Government period of training.

Very large numbers of pilots are now needed, and the new course will prove a valuable preliminary training. Full particulars may be had of the Principal, East London College, Mile End Road, E.

FRANCE.

Official Communiqués.

Dec. 13th.—Between December 10th and December 13th nine German machines were brought down by our pilots.

During the same period our bombing aeroplanes carried out various operations; 10,000 kilogrammes (about 10 tons) of explosives were dropped, notably on the aerodromes of Colmar and Schlettstadt (north of Colmar), the depot of Logelbach (outside Colmar), the factories of Rombach (west of Schlettstadt), the region of Wavrille (north of Verdun), Chambley (south-west of Metz), and Thiaucourt (south of Chambley), and the railway stations of Warmeriville, Luneville, Amagne, and Lucquy (all north-east of Reims). Effective results were observed.

Yesterday (Dec. 12th) enemy aeroplanes flew over Dunkirk and dropped bombs, but there were no casualties.

Dec. 16th.—Our chaser aeroplanes were active yesterday. Five enemy machines were brought down by our pilots.

It is confirmed that three other German machines crashed to the ground in the course of engagements fought on Dec. 13th and 14th.

Army of the Orient.—About 30 Allied aeroplanes bombarded the depots and the station of Cestovo (11 miles north-west of Lake Doiran).

An enemy aeroplane was brought down by our anti-aircraft guns.

* * *

A message from Paris, dated Dec. 16th, stated that in their last raid on Calais the German aviators dropped small packets, bearing an inscription in English purporting their contents to be a powder for making soup. Analysis revealed however that they contained a violent poison.

GERMANY.

Official Communiqués.

Dec. 11th.—Following strong reinforcements of the flying forces violent aerial combats took place, especially on the French front. The enemy lost 11 aeroplanes and one captive balloon.

Dec. 12th.—In November, the losses of the enemy's aerial forces on the German fronts amounted to 22 captive balloons and 205 aeroplanes, 85 of which fell behind our lines. The rest were seen to fall on the other side of the enemy's positions.

We have lost in battle 60 aeroplanes and two captive balloons.

Dec. 17th.—Lt. Müller has obtained his 38th aerial victory.

* * *

A message from Amsterdam, dated Dec. 11th, states that the German aviator Lt. Erwin Böhme, the successor to the command of the late Capt. Boelke, was killed on the Western front the day before the Kaiser awarded him the Order Pour le Mérite.

* * *

The "Daily Express" correspondent, Mr. Patrick Devitte, writing from Geneva on Dec. 12th says:—

A series of violent explosions at Friedrichshaven, in one of which a Zeppelin was destroyed and many workmen killed and injured, are reported in a telegram from Romanshorn.

According to Swiss travellers, the explosions occurred on Saturday last (Dec. 8th), when a thick cloud of smoke over Friedrichshaven was seen from Romanshorn, which is on the other side of Lake Constance. The smoke cloud hovered for several hours over the Zeppelin works, where apparently two sheds were destroyed.

The frequency of disastrous fires and explosions at military factories in Germany is occasioning great uneasiness there, and, as in the case of the great disaster at the Griesheim munitions and poison gas factory, all mention of these occurrences is rigidly forbidden so far as the German newspapers are concerned.

* * *

The "Svenska Dagbladet" reports on Dec. 15th that a big ammunition factory, which mainly manufactured bombs for the use of Zeppelins and aeroplanes, has been blown up near Kiel. All the factory buildings, as well as the railway station close to which they stood, were burnt to the ground, and the railway line destroyed to a length of several hundred yards. A number of people were killed.

* * *

Another report dated Zurich, Dec. 15th, states that an explosion occurred on Dec. 14th at the Zeppelin works at Friedrichshafen, as the result of an accumulation of gas becoming ignited. A number of persons were injured.

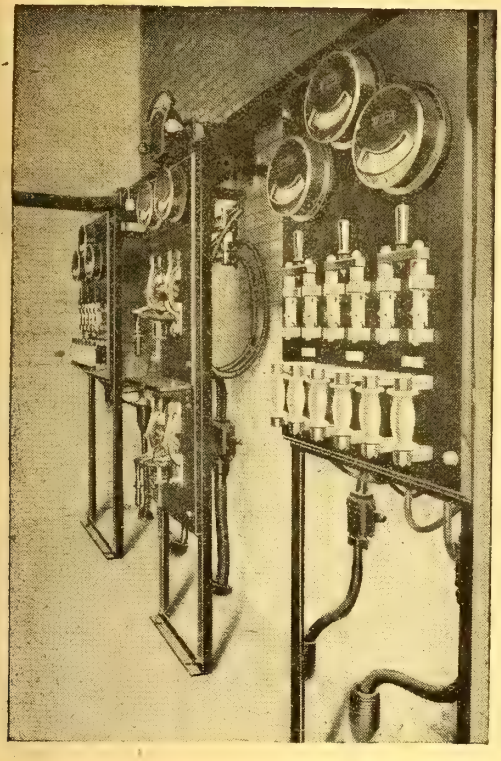
[It is not clear whether the explosion reported as having occurred on Dec. 14th is a belated account of what happened on the 8th, or not.—Ed.]

ITALY.

Official Communiqués.

Dec. 11th.—Two enemy aeroplanes were brought down during air fighting; one fell at Noventa di Piave and the other, for which our Allies' aviators accounted, near the Ponte della Priula.

Dec. 14th.—Three enemy machines brought down by our aviators fell in Val d'Assa (western edge of Asiago plateau), north of Asiago, and north of Mt. Grappa; a fourth machine



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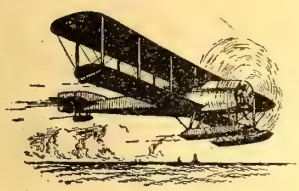
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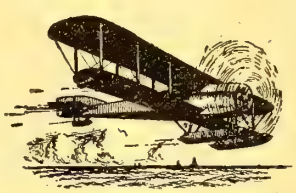
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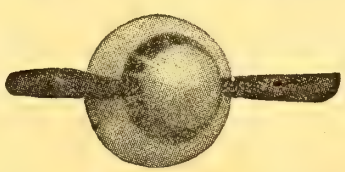
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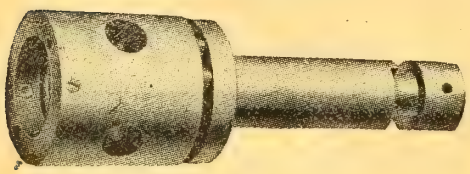
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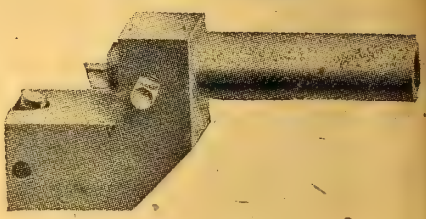
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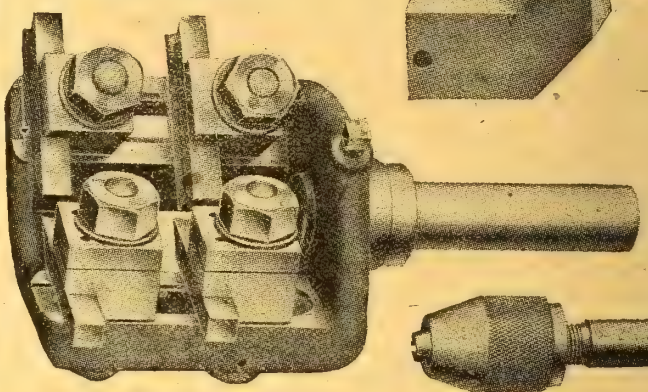
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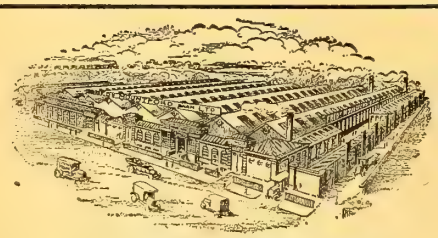
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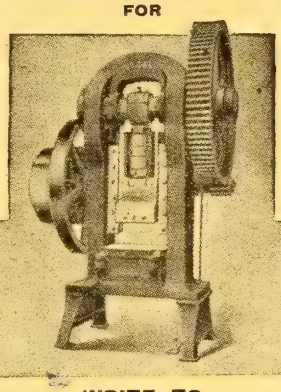
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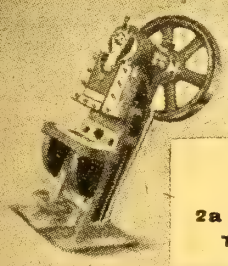
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was brought down by artillery fire in the vicinity of Susegana (on the Piave).

Dec. 17th.—On the night of the 14th-15th inst. movements of troops in the enemy's lines of communication were effectively bombarded by our airships.

A hostile aeroplane was brought down by a British aviator near Ormelle, and one of our own aviators accounted for another machine to the west of Seren Valley.

On the whole of the front the aerial activity was marked on both sides. In the zone to the north of Mont Grappa one of our Caproni squadrons and reconnoitring machines bombed and attacked with machine-guns on several occasions enemy infantry which had assembled at this point.

BELGIUM.

Official Communiqué.

Dec. 13th.—A German aeroplane has been brought down by Sous-Lt. Braun, of the Belgian Flying Service, in the neighbourhood of Nieuport.

HOLLAND.

The "Times" correspondent, writing from Amsterdam on Dec. 13th, says :—

Reports from Baarn (Holland) state that at 6.30 yesterday morning the British dirigible No. 26, flying the French colours, descended at Eemnes. There was no crew in it, but maps and coats were found in the gondola, and it is presumed that the crew was British.

The dirigible was driven by two 12 and 14 cylinder Daimler motors, which are intact, and which were still working when the dirigible came down.

In its descent the airship did some damage to telephone wires, chimneys, and trees.

A Dordrecht telegram says that an airman was discovered this morning near Sliedrecht. It is supposed that he had fallen from the airship. He has been taken to Dordrecht for internment.

The account is quaint. "French colours," of course, implies the usual Service tri-colour disc. A 14 cylinder Daimler would be interesting, if it existed, and an "airman" who fell from an airship would be better qualified for interment than internment.

U.S.A.

The following is from the "Daily Express" of Dec. 13th :—

I learn from Washington that a special resolution asking that a commission be given Miss Ruth Law, the famous girl aviator, has been introduced into Congress. Miss Law has visited many French flying schools, and is an experienced aviator. She will, it is declared, have no difficulty in passing the aviation tests of the American Army either in straight or trick flying. Miss Law is anxious to go to the front in France, and it is her ambition to be the first woman to drop bombs on Berlin.

AN AIR BOARD MARRIAGE.

BURGESS—BALLARD.—On Dec. 12th, at St. Mary's Cathedral, Glasgow, Samuel Burgess, F.C.I.P.A., of the Dept. of Aeronautical Supplies, Air Board Offices, London, third son of Mr. and Mrs. William Burgess, of 8, Grange Terrace, Leeds, was married to Gladys Maria, only daughter of Mr. and Mrs. J. J. Ballard, of Craiglea, Hillhead, Glasgow (late of Leeds), by Canon Lethbridge.

A WORKS' FESTIVAL.

A most enjoyable function was the annual Works Christmas Dinner of Handley Page, Ltd., which was held on Saturday, Dec. 15th, at the Connaught Rooms. Though carefully calculated not to cause cerebral commotion to Sir Arthur Yapp in that little bread or meat and no beer was consumed, the dinner would have drawn tears of envy from any inhabitant of Germany by its volume and excellence, a fact which perhaps was not fully appreciated by the majority of the audience, or they might have been even more enthusiastic in honouring the toast of His Majesty's Forces, proposed by Mr. Meredith, seeing that to the said forces they owe their daily bread, as well as the excellent dinner they had just enjoyed.

The officer who replied to the toast told his audience that all are now part of His Majesty's Forces, workers at home as well as sailors at sea and soldiers in the field. He said that he himself was an engineer, but had joined the Army because he funked staying at home, and he believed it took more courage to stay at home and work than to go to the front and die. One believes that he meant this in all sincerity, but one hopes that the withering sarcasm of it when applied to those who cause industrial troubles struck some of the able-bodied young men who heard his remarks.

Mr. R. S. Hubbard proposed "The Firm" in a brief and effective speech, saying that in a certain period the output was 3½ times what it had been in a corresponding period a year ago, and that this result was achieved with only twice as many hands. He said that pessimists believed that after the war aeroplanes would not be wanted and that aeroplane factories

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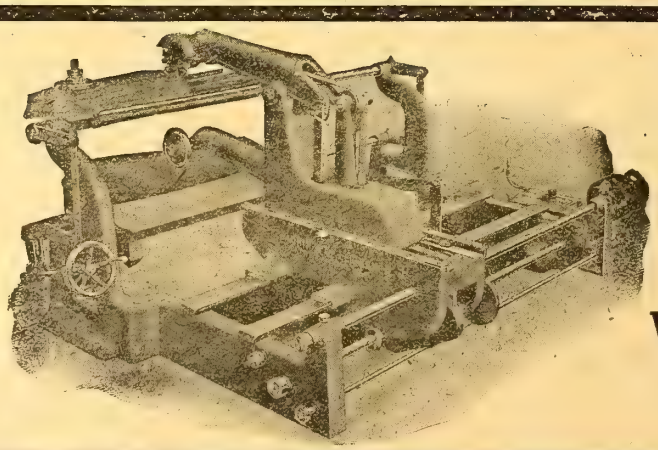
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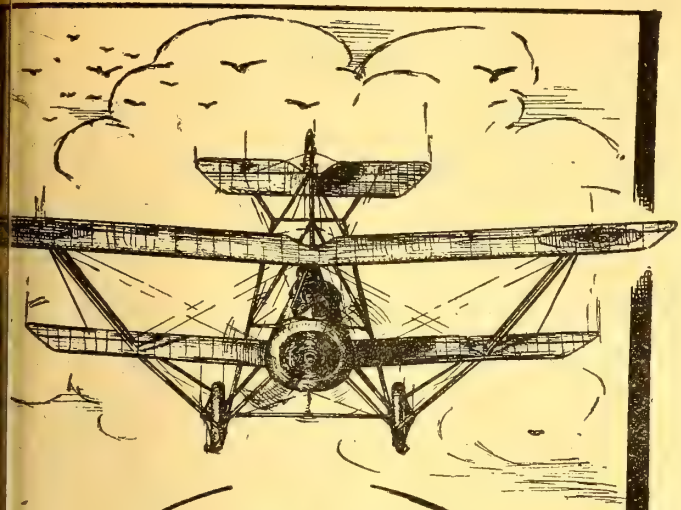
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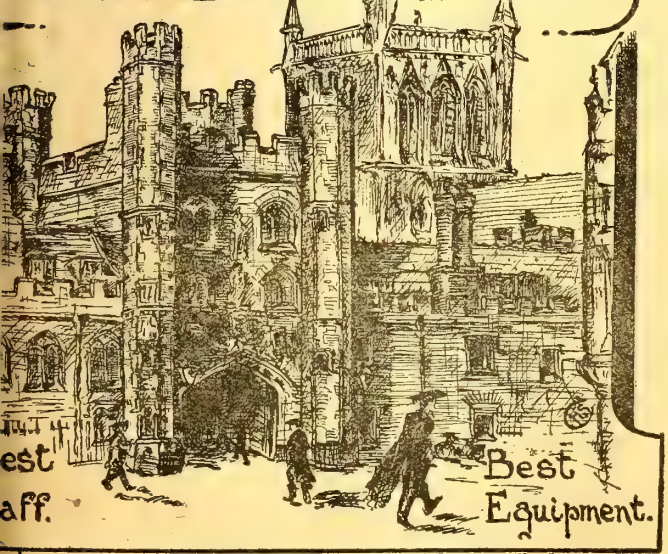
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The Aviation Catalogue gives the rest o the Kit, and a copy will be sent gladly on request.

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would have to start making perambulators instead. He personally believed strongly in the future of commercial aviation.

Mr. Handley Page in reply denied that he saw any need for the firm to contemplate making perambulators. He expressed his pleasure at seeing the firm's employees all here for the third time, and recalled the sad fact that on that same day five years ago Lieut. Parke, R.N., and Mr. Hardwick were killed on one of the early Handley Page machines. Mr. Page said that it was to pioneers like these victims that the science of aviation had advanced as it has to-day, and their names should go down to history revered and honoured.

After referring to the good work of the Handley Page machines, in the raid on Constantinople and elsewhere, Mr. Page remarked that he hoped the works output next year would not be merely 3½ times as much as the previous year—as in the case this year—but 350 times as much. Then, said he, we should be able to go and knock Hell out of Germany. Only by everyone pulling together could such an object be attained. An ammunition factory blown up in Germany would save the lives of the brothers and fathers at the front of those working in the factories at home, and he besought all his people to assist in this good work.

Early in the New Year they would all be housed in the new Handley Page works, where quarters would be more comfortable and where organisation would work more smoothly. Thus they would help more easily to achieve victory.

Mr. Theodore Page proposed the health of the visitors, and Mr. Workman, who has recently been doing splendid missionary work in America on behalf of British aviation in general and the Handley Page firm in particular, in replying besought his "fellow-workers" to get together and work their best so that the output of British aeroplanes would enable the Allies to beat Germany."

An excellent entertainment was provided, which was greatly appreciated by the intelligent audience.

A USEFUL CALENDAR.

The proprietors of Cellon dope are issuing to their customers a perpetual calendar, constructed on rather original lines, the adjustable names of the days and months being set into a table mirror.

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THE BRISTOL STRIKE.

The Bristol aeroplane workers, who have been on strike, as recorded in a section of The Aeroplane, which went to press in advance, met on Dec. 16th to receive the result of the negotiations with the Ministry of Munitions. After hearing the report they decided to return to work immediately. Negotiations with a view to the settlement of the differences will proceed.

THE PRICE OF PETROL.

Following upon the recent 2d. per gallon reduction (Nov. 26th) the Companies forming the Pool Board (Petroleum Supplies) now announce that owing to a further reduction in the Government War Risk Insurance upon vessels, the wholesale price of all grades of War Motor Spirit will be reduced as from Dec. 18th.

The new wholesale prices effect a reduction of 1d. in the retail prices to the public of War Motor Spirit, the current prices of which in England and Wales will be as follows:—

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It is understood that serious attention is being given to the question of turning to account the great natural advantages of the eastern side of Selsey Bill in connection with the Aircraft Industry. The area of inland water known as Pagham Harbour would appear to need little development to become a first-class testing ground for water-borne aircraft, whilst there are wide stretches of perfectly level land extending from the harbour which the removal of a few hedges more or less would convert into a natural aerodrome. It is believed that the present lord of the manor, to whom the harbour and estate belong, is sympathetically disposed towards the establishment of an aviation colony, and manufacturers not yet possessed of a sea outlet might do worse than pay a visit to the locality before making up their minds to go elsewhere. *Du reste*, Selsey is a rising place and land values have gone up there quite satisfactorily of recent years.

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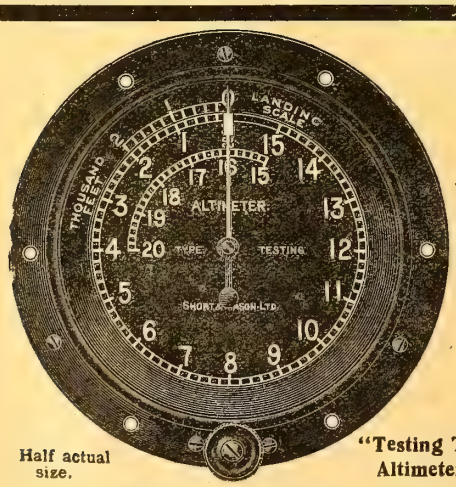
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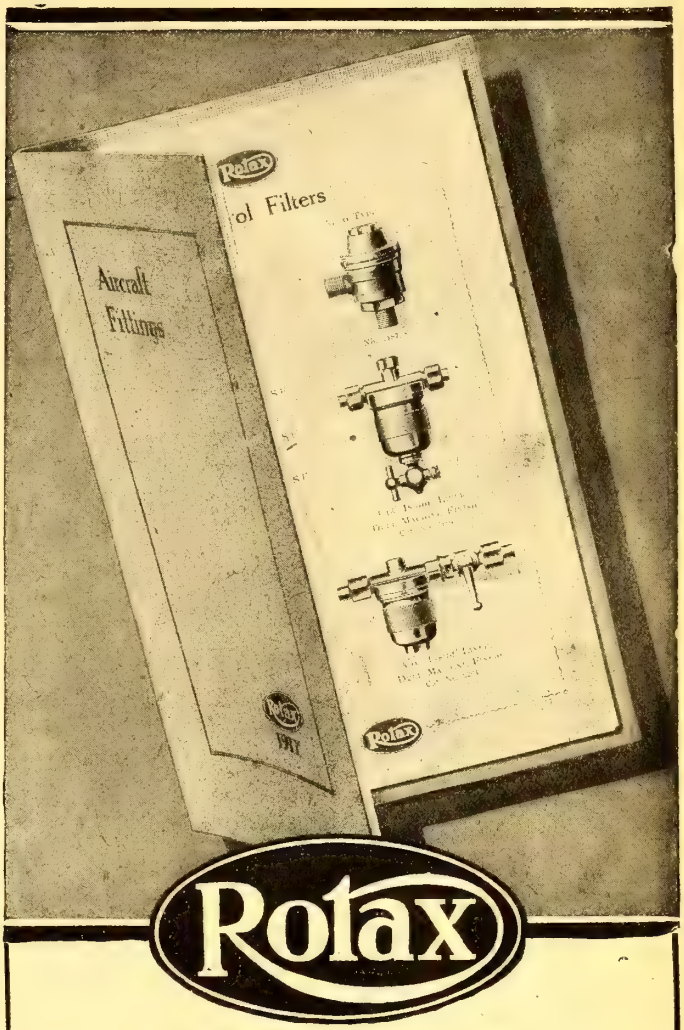
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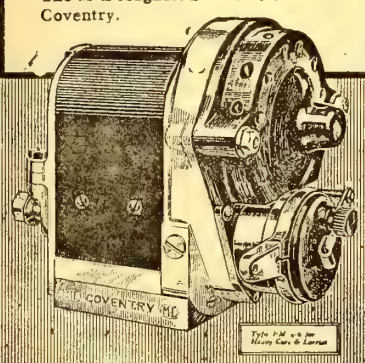
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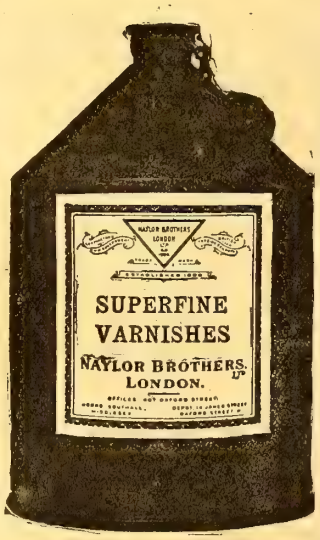
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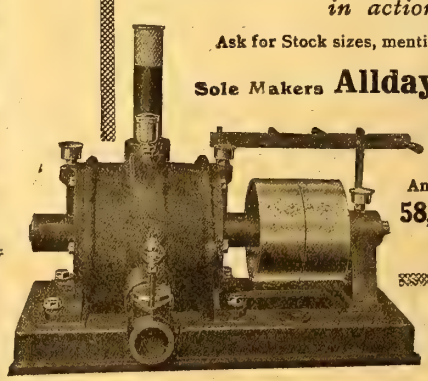
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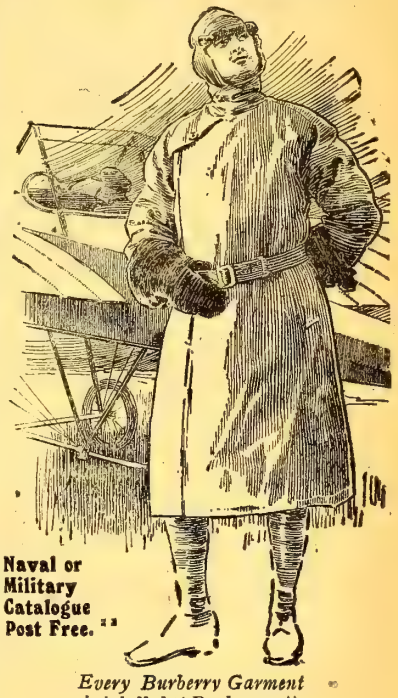
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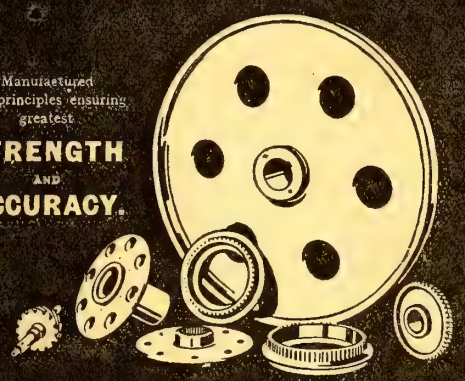
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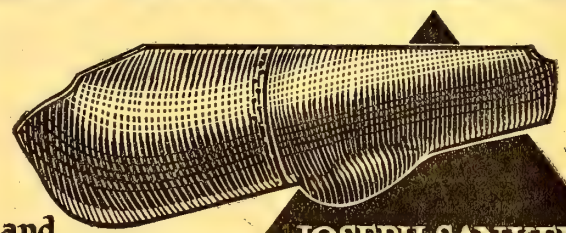
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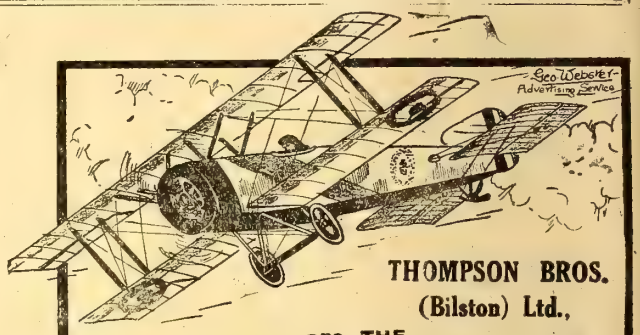
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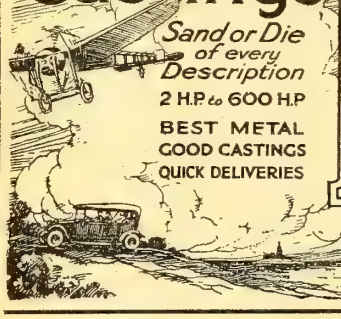
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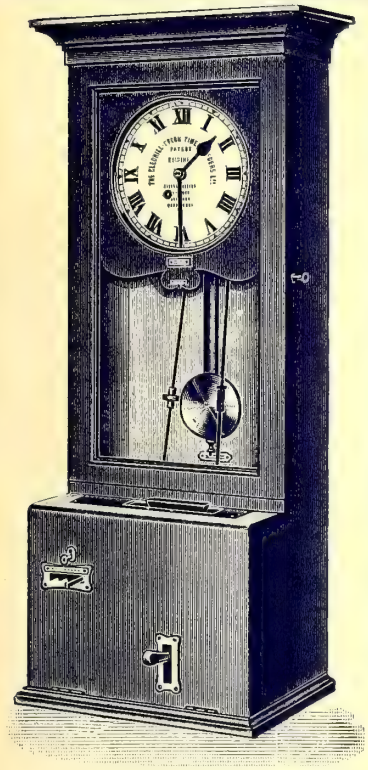
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1360	5.59 M 8.29 M 1.29 S	5.02 S			9½
32 Hrs	5.59 TU 8.29 TU 1.29 S	5.01 S			9½
	5.59 W 8.29 W 1.29 S	3.00 S	32 hrs	7½	
1510	3.00 S 6.00 TH 8.30 TH 1.29 S	5.01 S		2	9½
11½ Hrs		5.00 S	11½	9½	9½
K.31	6.00 M	7.00 F		1	
E.53	7.00 F 8.29 F	10.00 F		2½	
1820	10.00 F 1.30 M	4.00 M		5	
1469	4.00 M	5.00 M		1	9½
		TOTAL FOR WEEK			53

Job No.	Brought Forward	This Week	Jobs Finished	Carried Forward
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1469				1

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THE AEROPLANE

Edited by C.G. Grey

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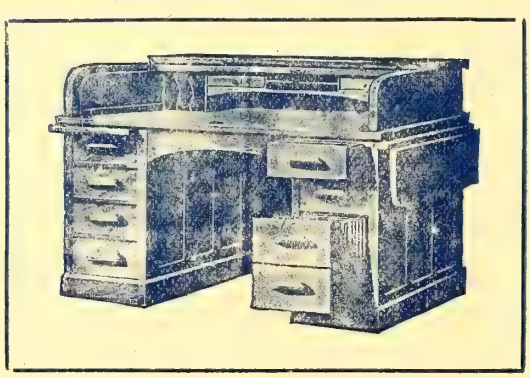
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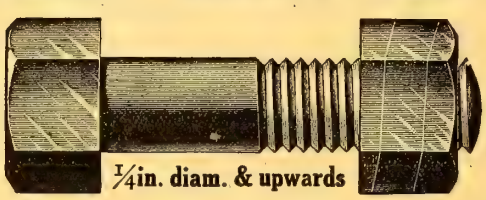
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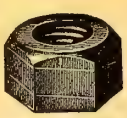
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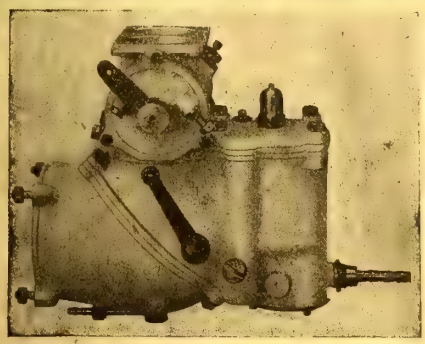
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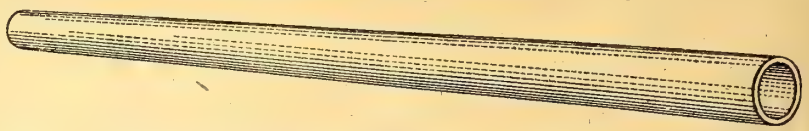
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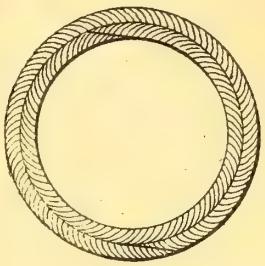
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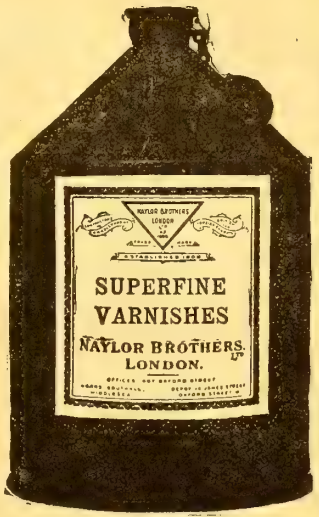
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ON COMRADESHIP.

One of the chief results of this war ought to be the binding together in a true spirit of comradeship of all those millions of men who have served the King against the common enemy. Already one result of the war has been to bring close together, to their mutual spiritual good, the classes which used to be dissociated because one worked—or addled—in a coat, and the other worked—or miked—in overalls or shirt-sleeves. The fortunes of war have decreed that many a man of the coat-wearing class should fight and die as a private soldier, and that many a man of the shirt-sleeve class should win distinction as an officer.

On active service it is the man who counts, not his artificially produced position at home. Granted that the man with brains, and sometimes the clever schemer, gets the best jobs, it is nevertheless fairly safe to say that solid worth finds its way to the front quicker in the King's Services during war than it ever does in civilian employment in peace. The result is that in the Army to-day, and in the irregular branches of the Navy, such as the R.N.A.S., and the trawler patrols, one finds the strangest of social mixtures taking place with excellent results.

The young "knut" who enlisted and fought his way up to a commission not only finds that the shop-boys and coal-heavers with whom he lived during the first year or so of the war are as good pals as he ever had in his life, but also finds, when he gets his commission, that his former tailor makes quite a good company commander, and that his former dentist, or the cove from whom he bought second-hand motor-cars, doesn't make half a bad brigade commander. The result is a curious mix-up in everybody's mind all round, and the general healthy effect should on no account be allowed to die after the war. Therefore I appeal to readers of this paper to take a personal interest in that excellent organisation known as "The Comrades of the Great War."

"Broke in Our Wars."

This organisation has been founded by a group of Service people for the purpose of holding together after the war, for their mutual benefit, people who have served during the war, and I submit that it is of just as great interest to people in, or interested in, the Flying Services as to anybody concerned with any other branch of the King's Services.

One of the crying shames and one of the national disgraces following on all our previous wars has been the rotten way in which broke fighting men have been treated by the Government and the people alike. And it is only too true that precisely the same thing is already happening in this war.

Your fat and well-fed profiteer, whether he be a manufacturer, a merchant, a shopkeeper, or a workman who has rushed his wages up hundreds per cent. by striking at critical moments of the war and depriving the fighting men of munitions—like the people of Coventry—cares little enough what happens to the people who not merely made his money for him, but prevented the common enemy from treating him as he has treated the Belgians and the Northern French. It is up to the fighting men to see that they come into their own after the war, and that those of them who are "broke in our wars" are treated as they deserve to be treated.

A Case in Point.

Only the other day a discharged soldier called on a friend of mine. He had held a decent position in the City before the war, as one of the coat-wearing class. He had a wife and three small children. But, being a young man, he enlisted early in the war. Some months ago he was discharged, pretty much of a wreck, wounded, shell-shocked and gassed, physically incapable of doing the work of an able-bodied man. His pension is 16s. per week, which merely means slow starvation. He cannot find work, for none can be found for an unskilled man.

Some weeks ago he went to a great small-arms factory, a place swarming with fine healthy young unmarried men, well in Class A, who ought to be in the trenches. He asked for a job, anything which would buy food for his family. But he was not young and "skilled," and he coughed because of being gassed. He begged of a fat and well-favoured foreman that he might be taken on to sweep the shops. And the foreman said, "We don't want your sort here, coughin' and spittin' all over the place." Seemingly the comfort and health of his young Class A trench-dodgers was more to that foreman than the good of the man who had helped to keep him from under the heel of the Hun.

My friend, who is not a rich man, did what he could for the poor chap, and later on the same man brought him a list of about a dozen others, all in a similar plight. Broken in health, unable to find work, and dragging out a miserable existence on a paltry pension.

The Need for Combination.

Now that sort of thing has got to be stopped, and the way to stop it is for the men who are fighting to-day, and the men who have been fighting and are now discharged, to get together and combine into a solid body of such strength that no Government after the war will dare to neglect its demands for justice, even if the said Government be entirely composed of shop-stewards, Syndicalists, Conscientious Objectors, Pacifists, and other shirkers and cranks. There are all of five million men in uniform to-day, and if they could all be induced to combine they could practically run the country as they chose after the war.

The matter is quite as important to officers and men

of the Flying Services as to Infantry, Cavalry, Guns, or Auxiliary Services. If, after the war, we go mad on disarmament—as we are quite likely to do—our great new Air Force will dwindle to nothing, and its hundreds of thousands of men will want work. Even if we remain sane—as, by the grace of God, we may do—and maintain a big air fleet, many men will still be discharged, and will naturally hope to find work in aircraft factories. But, as Colonel O'Gorman very sagely pointed out in his lecture a week or two ago, hundreds of thousands of hands will be discharged from aircraft factories when peace breaks out, for at present we are building at a rate calculated to replace our whole air fleet eight times a year, and under no possible circumstances could we go on building at such a rate in time of peace.

Therefore, there will be little enough chance of anyone getting out of the Flying Services into the Aircraft Industry when what Colonel O'Gorman called "the cataclysm of Peace" occurs. Some very exceptional men with special experience or unusual qualifications may be taken on here and there for particular technical jobs, and possibly a certain number of skilled Service mechanics may be taken on in the surviving aircraft factories, to replace hands who have been marked down as slackers or disturbers of the peace, but on the whole the immediate prospects are not encouraging. And so it will be well for the officers and men of the Flying Services to join with the other Services in establishing on an immensely strong foundation an organisation which will see to it that the sailor and soldier gets his just dues when he returns to civilian life. It is in the interests of the nation as well as in their own interests that they should do so.

En Parenthèse.

As regards the future of the Aircraft Industry, I do not wish it to be understood that there is no future for aircraft engineers and mechanics. Some day the Aircraft Industry will be a bigger thing than the Shipbuilding Industry or the Railway Industry, for the aeroplane is the only vehicle which ranges in size all the way from a battleship to a motor-bicycle.

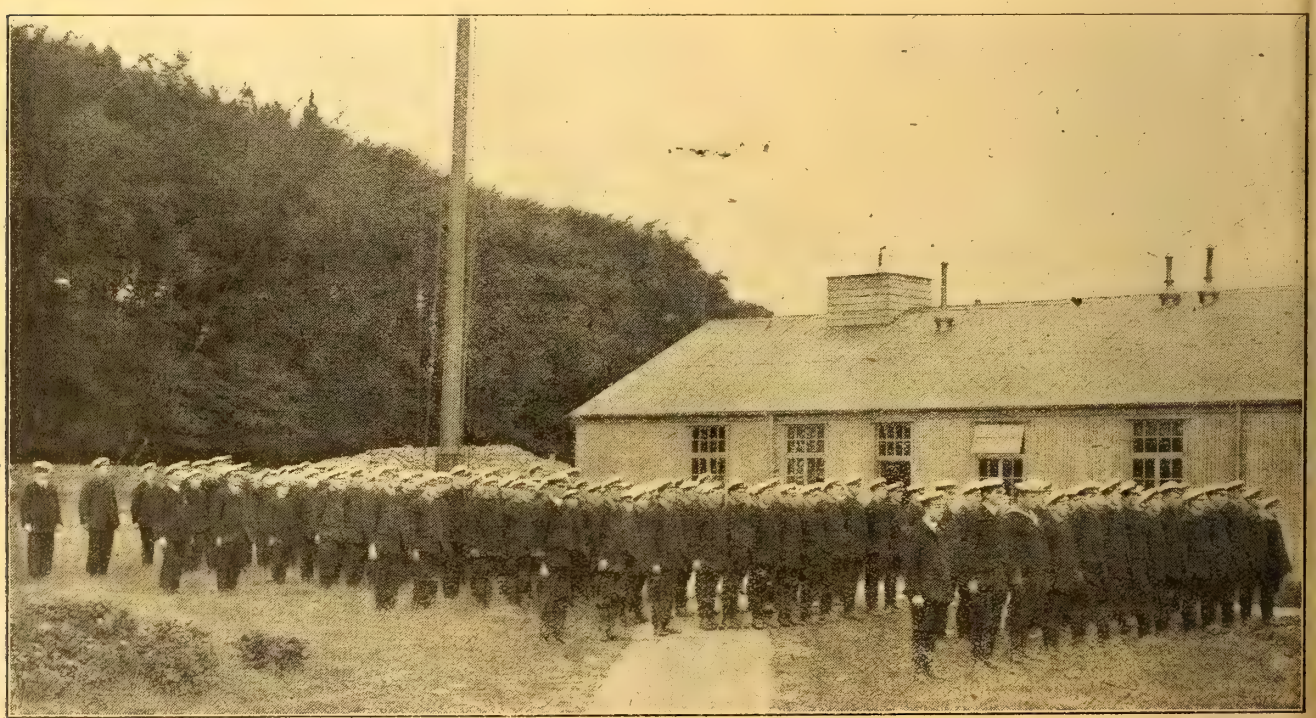
Those who have been privileged to see a funny little machine known as "The Kitten"—more I dare not say about it—can form some idea of the young man's "joy-ride" aeroplane of the future. It can be built and sold commercially for £150 or so, when things settle down and flying for sport becomes sufficiently common to enable the Aircraft Industry to devote special attention to sporting machines. At the other end of the scale we have such machines as the Handley Page, the Porte Boat, and the Caproni, which are merely miniatures of the big passenger and mail carriers of the future. In between we shall have all sorts of steps, such as the young man's fast two-seater, the well-to-do man's "family tank," the aerial transport companies' special dispatch machines for rich men in a hurry, the ordinary aerial taxi, and so forth.

But it will be many years before the Industry grows to that extent. We shall have all the absurd anti-novelty legislation over again, which cramped railways and bicycles and motor-cars. We shall have to fight ignorant prejudice as they fought it, and as labour-saving machinery fought it. And it will not be till the children of to-day, who cannot remember a time when there were no aeroplanes, grow up and govern the country, that the new locomotion and with it the new industry will reach its full development. Meantime there is a howling hiatus to be bridged.

A Very Present Help in Time of Peace.

However, to return to The Comrades of the Great War. Let it be thoroughly understood that this is no revolutionary organisation formed to embarrass future Governments and to cause strife and factions in the country after the war. It is a solidly backed, substantially and respectably organised body formed with motives of the highest patriotism to help those who have helped the country in its time of peril to help themselves in time of peace. And it is not designed to help them to help themselves in the manner of the profiteers during the war.

A glance at the names of the executive committee is a guarantee of the honesty of the concern. The Chairman is Colonel Wilfred Ashby, M.P. The others are Admiral the Hon. Sir Hedworth Meux, M.P. (Lord



THE YOUNG IDEA.—R.N.A.S. Boy-Mechanics (Wireless Telegraphy) on parade at their training centre.

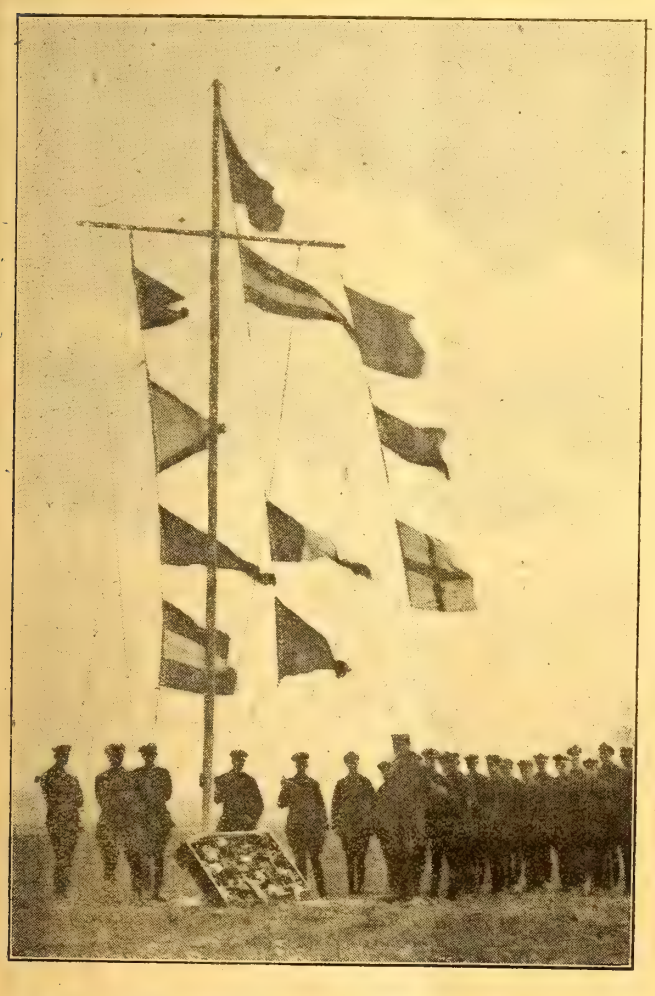
Durham's brother), Captain Towse, V.C. (who won the Cross and lost his sight in South Africa), Colonel Sir Hamar Greenwood, M.P., Major Davies, M.P., Colonel Sir John Norton Griffiths, K.C.B., D.S.O., M.P., Captain Albert Smith, M.P., Captain Donald Simson (of New Zealand), and Mr. H. T. Boatman (late C.P.O., R.N.). N.C.Os. and Privates of the Army and a Petty Officer R.N. are to be added to the Committee when the show gets going.

The secretary is Mr. P. J. Hannon, already famous as the secretary of the Navy League, which did so much for the Navy, and for aviation, before the war. Mr. Hannon, an old friend of mine, is an energetic and sympathetic Irishman to whom no man in trouble will ever go without receiving a fair hearing and whatever help can best be given him.

The names of the Committee, quoted above, show that they are in themselves an unusual combination. They are men of Service experience and unusual distinction, while at the same time they are members of Parliament of such standing that they can afford not to be politicians, and so can carry the weight of independent members. Thus they can truly represent in the House of Commons the Comrades of the Great War.

Aims and Objects.

Therefore I cordially invite all my Service readers to support this organisation. The membership is open to all ranks and ratings, and every Comrade is eligible for the highest office or position within the organisation. No serving sailor or soldier can join the Comrades while on active service, but if he wishes to show his sympathy with its objects he can become an Honorary Foundation Member, and join as an active member as soon as he leaves the Service.



TEACHING THE YOUNG IDEA.—R.N.A.S. Boy-Mechanics (Wireless Telegraphy) under instruction for Naval Signalling.

The Organisation of the Comrades will be as follows:

1. Central Headquarters in London.

2. National Headquarters for England, Scotland, Ireland, and Wales.

3. Divisions in all the Counties of the United Kingdom.

4. Branches of not less than 100 members, and Posts of not less than 10 members in all towns and villages.

Branches and Posts will be affiliated to County Divisions, and voting power will be strictly on the basis of membership.

The objects of the Comrades are:—

(1) To perpetuate the memory and story of the gallant men and women who died for their country.

(2) To perpetuate the spirit of comradeship, patriotism, and devotion which has characterised the Naval and Military Forces of the Empire, and to foster these qualities in the rising generation.

(3) To watch and safeguard the interests of all ex-members of the Forces, and to take such steps as are necessary to protect them now, during, and after demobilisation.

(4) To press the claims of discharged sailors and soldiers to State and public employment; to enlist the co-operation of employers for the same object; and to support undertakings for the suitable training and employment of disabled men.

(5) To secure adequate pensions for discharged sailors and soldiers

(6) To impress upon Parliament the need of an appropriate scale of Pensions for men discharged on account of ill-health or incapacity arising from Service.

(7) To help discharged men to prepare their necessary papers, and to see that their pensions and allowances are in order.

(8) To promote the welfare of the women and children left by those who have fallen.

(9) Te see that all monies raised and contributed from any source for the welfare of sailors and soldiers are utilised for that purpose, and not diverted to other objects.

The subscription of a Comrade to his Branch or Post shall be not less than one shilling annually.

There shall be an Advisory Bureau in every Branch, where all difficulties and complaints will be considered and forwarded to Divisions or to Headquarters.

The Central Headquarters in London will give every assistance in the formation of Branches and Posts.

All communications to Headquarters will receive immediate attention, and should be addressed:

The General Secretary,
Comrades of the Great War,
98, Victoria Street,
London, S.W.1.

The paragraphs underlined should indicate sufficiently the purely material benefits to be conferred by the organisation.

If one might make a suggestion it is that the Women's Army, to include all women serving the King in uniform, should come within the scope of the Comrades. Possibly a little influence from those extraordinarily capable women who are doing such good work with the armies in almost all parts of the world might be beneficial.

Already some of our leading aircraft people are interesting themselves in the organisation, and have given handsome donations to its funds, so I trust that others will follow suit. But, above all things, I hope that the officers and men of the Flying Services will become honorary members now, and active members if and when they leave their Service.—C. G. G.

A FUTURE CAREER.

"What shall we do with our boys?" used to be one of the chronic problems of pre-war days. To-day the question is only varied into the form, "Into which of the King's Services shall we put our boys?" The wise father is he who puts his boy into a branch of the Services which assures his boy learning a business which will be of use in after life, whether he remains in the Service or leaves it when his term is finished. And the lucky boy is he who manages to get into such a branch of the Services.

It goes without saying that both during and after the war the use of Wireless Telegraphy will increase in quality and quantity, and for this reason it is interesting to learn that there are many vacancies for youngsters of the right kind to be trained as wireless telegraph operators in the Royal Naval Air Service.

Whatever may be the future of the R.N.A.S. in relation to the Air Force which is to come into being in due course as the result of the passing of the Air Force Act, it is, at any rate, certain that more and more seaplanes will be built, and that consequently more and more "wireless" operators will be needed. Moreover, the very special training given to R.N.A.S. wireless operators ensures their knowing several ways of earning a living if they eventually leave the Services.

The candidates for appointments as operators are enlisted as "Boy mechanics (W/T)," and they are selected from among the lightest and most intelligent applicants. It is obvious that an aeroplane or seaplane which has to carry a somewhat complicated wireless apparatus cannot afford to carry either a heavy man or a stupid man to work it. Intelligence is particularly necessary because in performing their duties at sea the operators on seaplanes have to combine an intimate and thorough knowledge of a highly technical trade with the traditional resource of the sailor.

It is fairly obvious that the wireless man on a seaplane should know enough about engines and about the manners and customs of aeroplanes in general to be a real help to his pilot if they are compelled to alight against their will far out to sea. An S.O.S. signal on the way down would certainly be very useful in summoning help, but it would be at least equally useful if the W/T man could, by his knowledge as an air mechanic, enable the machine to get off the water again and continue its duties.

Not only is it desirable that the W/T man should be as knowledgeable as the ordinary air mechanic, but it is essential that he should have a particularly efficient brain for him to be able to maintain the same standard of communication—that is to say, the same rate of sending and receiving—as any other Naval unit, for he must do so in spite of the roar of the engine, and the distracting effects of many other things incidental to flying. Thus it may be seen that a particularly good quality of lad is required.

All patrol seaplanes in these days carry a wireless operator, just as any seagoing ship in these days must carry wireless, and the responsibility placed upon these lads operating the wireless plant on an aeroplane is evidently far greater than that of other lads of similar age in the Air Service, which is why such care is taken to select only the pick of the applicants. The good work of the W/T operators in the present war has not been allowed to pass without recognition, for, in proportion to their numbers, the wireless people have won more honours than any other section of the R.N.A.S., and that is saying quite a lot.

Selection.

In selecting boys for training in wireless telegraphy, the authorities do not insist on previous knowledge of the subject. But some knowledge, whether practical or theoretical, of electricity is a distinct advantage. General brightness, however, is what counts most highly, and a superior class of boy is picked. Usually the chosen candidates have had some secondary school education. In the early days of the war some of the best Boy Scouts were entered, and proved highly satisfactory operators.

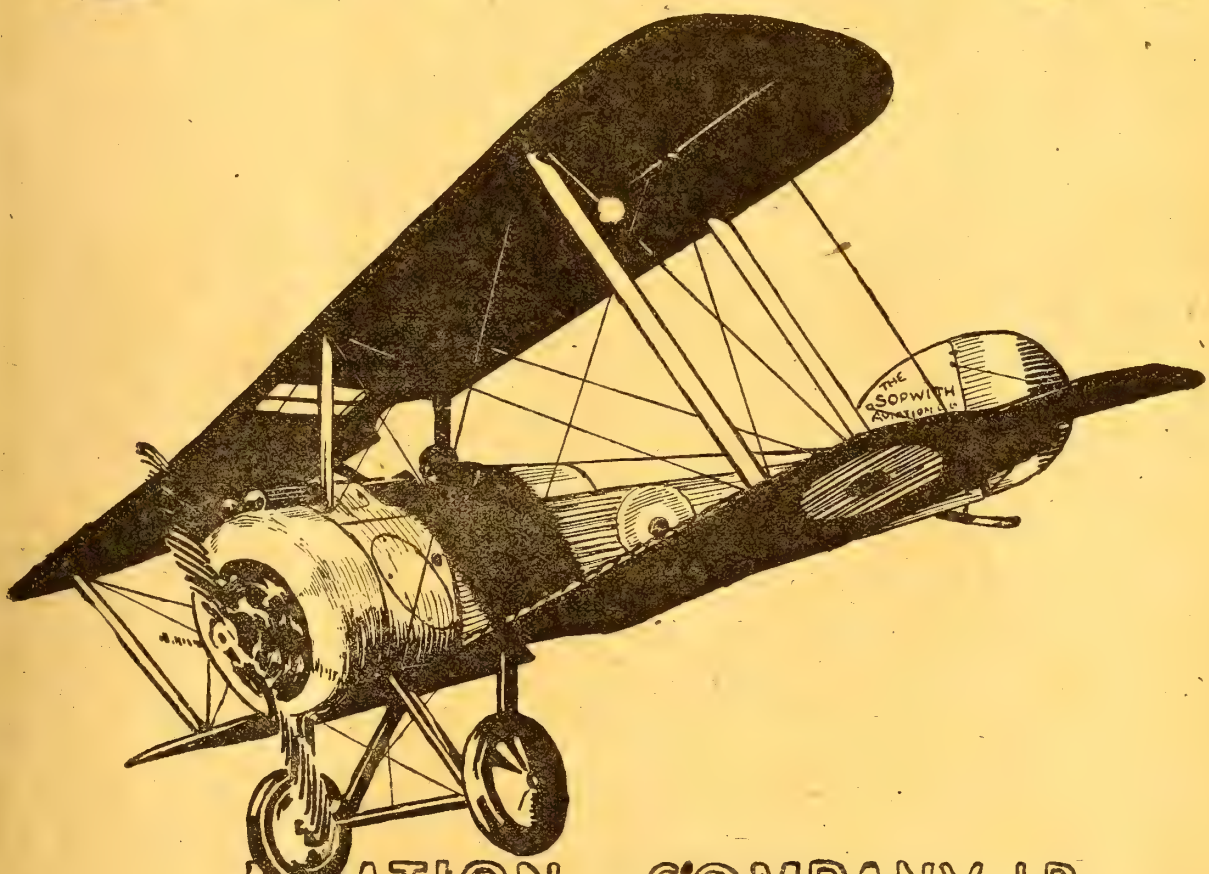
The selected candidates wear the ordinary uniform of the R.N.A.S., with the letters "W.T." as a badge. This



A Wireless Operator in Training for the R.N.A.S.

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distinction is, naturally, one of which the boys are very properly proud, marking them out, as it does, for a class apart from the ordinary boy mechanics

An Attractive Adventure.

An additional temptation to the right sort of boy to join this particular branch of the Service is the fact that all boys are called upon to fly. They also do a certain amount of wireless work on the ground, as it is, of course, necessary for them to be able to operate the sending and receiving stations ashore or on board ship, but, in these days, when the ambition of every British boy worthy of the name is to fly, the opportunity thus afforded of flying and of doing wireless work at the same time should, and in fact does, appeal strongly to a great number of youngsters.

Already boys entered early in the war have done good work in Mesopotamia, East Africa, the Dardanelles, throughout the Mediterranean, at Dunkirk, and on seaplane carrying ships, where their work has been full enough of adventure and interest to attract any British boy of the right sort, but to-day there is the additional attraction of submarine hunting to tempt candidates to this branch of the Service. Just how the wireless operator comes into the scheme of submarine searching cannot be told here, but one gathers that this particular duty combines all the sport of whaling and big game shooting, with the additional satisfaction of knowing that every time the hunter secures his prey he is adding materially to the nation's food supply. No patriotic youngster with a craving for adventure could ask for a better job than this.

The Scientific Interest.

The wireless work which the boys have to learn is itself of absorbing interest. Enormous strides have been made in the development of wireless apparatus since war began, and even the wonderful systems of communication of which Mr. Rudyard Kipling wrote in those two fascinating stories, "With the Night Mail" and "As Easy as A.B.C.," impossible as they seemed when they were written, are almost within sight of the modern wireless man.

The youngster who now joins the Service for wireless work has the advantage of beginning to learn practically where all the pre-war operators left off. He has all their dearly bought experience at his disposal, and he has it cut and dried, and sorted out for his consumption and easy digestion.

It has been said that there is no royal road to learning. That is true, but there are roads to learning which are available to everybody in all walks of life, thanks to the trail through the jungle of ignorance having been cleared by the labour and self-sacrifice of the pioneers. And in wireless work some wonderful roads to knowledge have been cleared by the pioneers of wireless in connection with aircraft.

The old apparatus used on ships is, of course, far too heavy for use on aircraft. New and special apparatus, very light and of surprising efficiency, has been evolved for aeronautical work. This special apparatus is what the R.N.A.S. wireless folk have to handle.

All Round Knowledge.

Apart from wireless work, the R.N.A.S. operators learn naval signalling by means of flash-lamps, flag wagging, flag hoists, semaphores, and so forth. They also learn general aeroplane work, rigging, splicing, and other things calculated to be of use in an emergency.

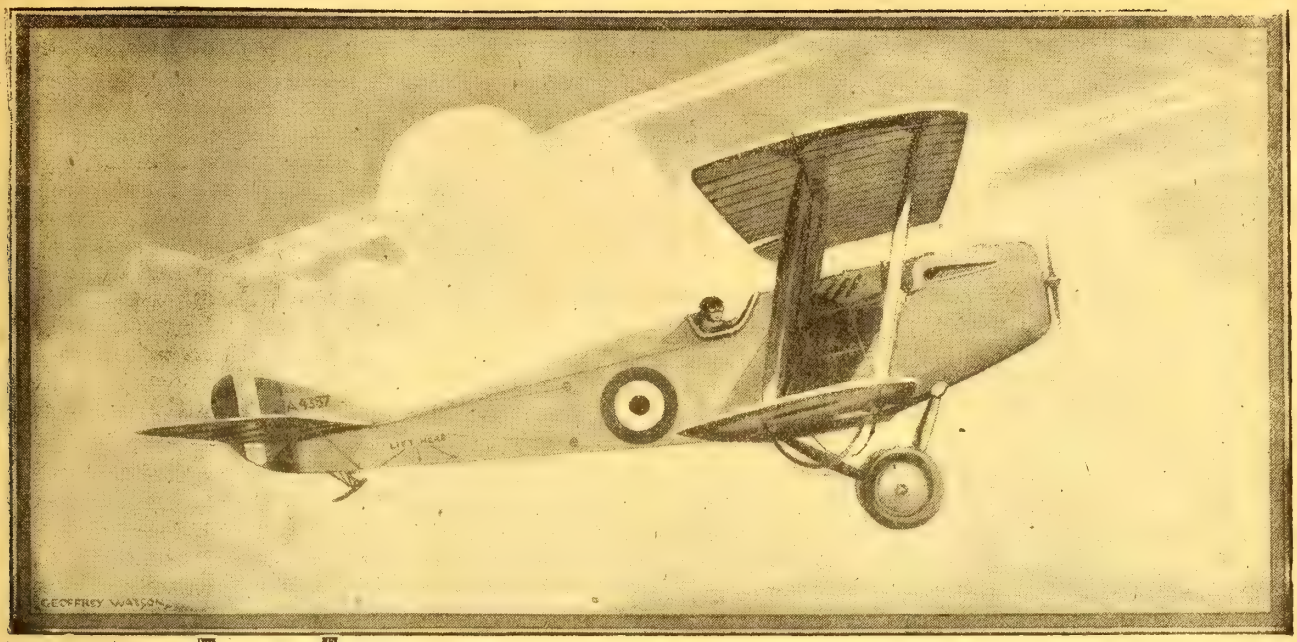
They are taught the mechanism of machine-guns, and aerial gunnery, so as to be able to defend their machine against enemy attack, and to fit them to take their part, when need be, as units of the crew of the large aircraft now in use. They are also taught to drop bombs, with the help of the latest and most efficient bomb-sights and bomb-dropping gear.

They are also taught general navigation, such as is necessary to any capable sailor, as well as the special branches of navigation applicable to aircraft, for all this comes in useful at one time or another.

The wireless operators are, in fact, about the busiest people in the air. A glimpse of the wireless operator's cockpit in a patrol seaplane is enough to make an untrained person who does not understand the new order of things wonder how on earth, or in the air, the operator can do all at once the multitudinous jobs he is supposed to do. Yet such is the well-organised system of training that any intelligent lad can pick it all up, and



Wireless Operators for the R.N.A.S. under instruction in buzzing, at their central training station.





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work all his gadgets efficiently, without undue risk of breakdown from brain-fag.

Usefulness and Gallantry.

Besides his regular duties in relation to his own aircraft, the lives of the crews and passengers of torpedoed ships on occasion depend on the presence of mind and promptness of action of the W/T operators of patrol aircraft, in getting in touch with patrol ships, and calling them up to the help of the victims of Hun frightfulness.

Many a fine tale could be told of the good work and gallantry of operators on patrol craft. There is one example in the brief official mention of a man on a twin-engined patrol seaplane engaged on submarine searching, who, when a radiator was hit by a bullet, climbed out along the wing, plugged the hole with his fingers, and remained in that precarious position for twenty minutes, thus preventing the engine from seizing up owing to loss of cooling-water, and so enabled the machine to fly to a place where a proper repair could be made in safety.

In their own sphere of action, as distinct from seaplane work, the W/T operators on the patrol airships, whether the large Coast Patrol—or C.P.—type, or the little Submarine Scout—or S.S.—type, commonly known as "Blimps," have an equally fine record. Some day, one hopes, it will be possible to publish some of the adventures of our airship crews, and if so it is certain that the gallantry and resource of the W/T operators will find a prominent place in such histories.

Further Education.

The education of wireless men does not by any means cease with their leaving the central school of instruction. At regular intervals, after a period of active service, they may go back for a "refresher course," so that they may learn all that there is to know about the newest instruments and the latest developments of wireless science. Incidentally, many and strange are the yarns spun by these returned wanderers to the youngsters in the senior classes, who are just about to leave the school, and are therefore brought in touch with the older hands by working on the same up-to-date instruments. Fresh air and Hertzian Waves apparently stimulate the descriptive faculty, and occasionally the imagination, but the net result is all to the good, for the new hands leave the school determined to live up to the standard of the earlier inhabitants.

Future Careers.

As in all specialist branches there is a very strong *esprit de corps* among the wearers of the W/T badge, and the members of this branch have undoubtedly a great future before them, whether in the Service or out of it. It is not so hard in these days to get a commission from what used to be called "the lower deck." Many R.N.A.S. officers began their Service careers as "ratings," and in such a highly educated, carefully selected, and skilfully trained branch as that for Wireless Telegraphy, boys of the right stamp are bound to find opportunities for special and rapid promotion.

Particulars of Service.

For the benefit of intelligent and ambitious lads who wish to join the wireless branch of the R.N.A.S. the following notes are published, based on official documents :—

Applications for Enlistment should be made to the Royal Naval Air Department, N.4.F. Section, Room 493A, Hotel Cecil, Strand, London, W.C.2.

Period of Service.—Boy mechanics are enlisted on three months' probation, and thereafter, if satisfactory, for the period of hostilities. Volunteers up to 50 per cent. of the number enlisted will be allowed to transfer for permanent service.

Pay is at the rate of 1s. per day and all found, until promoted to Air Mechanic, 2nd Grade, after which pay, promotion, etc., is as for other Air Service ratings.

Purpose.—Boy Mechanics enlisted in the Royal Naval Air Service to be trained as wireless operators must be prepared to fly in any type of aircraft at home and abroad. They must be physically fit in every respect. Full vision is essential without the aid of glasses.

Age.—Boys may apply for an interview on attaining the age of 16 years and nine months, but they will not be required for service until they reach 17 years of age. The maximum age for entry is 17 years and six months.

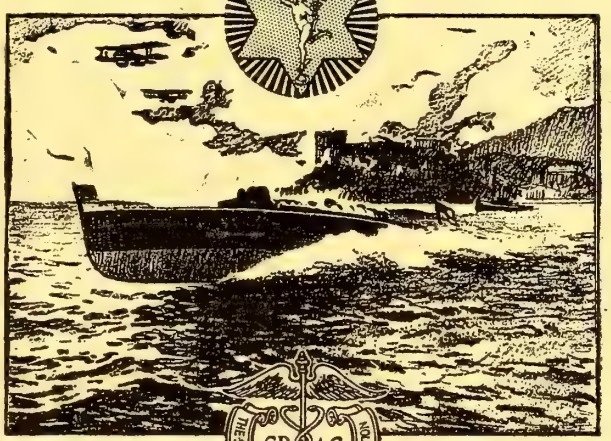


The Quarters of the Boy-Mechanics in training as Wireless Operators at their central training station.

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Promotion to 2nd A/M.—Boy mechanics are promoted to Air Mechanics 2nd Grade, with pay at the rate of 2s. per day, and all found, on completing their wireless training, if they have by then attained the age of 18 years.

Accelerated Promotion to 2nd A/M.—Twenty-five per cent. of boy mechanics who are considered efficient wireless operators before reaching the age of 18 may be "ear-marked" for accelerated promotion to Air Mechanic 2nd Grade after three months' service from the date on which their training was completed, if they are recommended by their commanding officers. Such accelerated promotion is dated back to the date on which their course at the training establishment was completed, provided that the boy was then 17½ years of age.

If accelerated promotion is not granted to boy mechanics who are eligible, they will be promoted automatically to Air Mechanics 2nd Grade on attaining the age of 18.

Uniform.—For boy mechanics under tuition the uniform is the same as that of an Air Mechanic 2nd Grade, with the exception that no badges are worn.

When the boy mechanic becomes a qualified wireless operator he then wears the uniform of an Air Mechanic of his particular grade, plus the W/T badge.

Note.—All candidates are selected as the result of a personal interview.

A Personal Note.

It is my earnest hope that readers of this paper who know of intelligent lads, of an age at which they are thinking about choosing a career, will bring this article to their notice, so that they may consider seriously the subject of applying to join the W/T branch of the R.N.A.S. There they will associate with a chosen band of youngsters of their own mental calibre, and will meet senior men and officers of a superior class, so that the whole tendency of the most critical year of their lives, between the ages of 17 and 18, will be to improve their mental and social level. The discipline of the school will do them good, and the training will be of the greatest benefit. The result is bound to be better than if they went into a workshop to associate with the tag-rag and bobtail of the neighbourhood, and learn all sorts of bad habits through being under no sort of discipline outside of working hours. In the R.N.A.S. they will acquire knowledge, and will have opportunities for adventure, promotion, and honours which they would never have as civilians, and would have in few other branches of the King's Services.

C. G. G.

THE INVASIONS OF ENGLAND.

In the early evening of Wednesday, Dec. 19th, under the circumstances reported in the official communiqués, the first aeroplane raid on, what was for all intents and purposes, a moonless night took place. Judging from the fact that only two or three aeroplanes reached the capital out of a score or so, the anti-aircraft defences were as satisfactorily operated as on the occasion of the previous raid. It is also satisfactory that one machine was brought down.

The official report that R.F.C. pilots attacked Gothas over London is not without interest. One trusts, however, that the greatest care is being taken that the work of the guns and the aeroplanes is properly co-operated, as the risk of the work of the two arms clashing requires very careful watching. Naturally, the anti-aircraft gunners do not want their style cramped by the fear of hitting a British aeroplane, and the British public do not wish to experience the tragedy of seeing a British aeroplane brought down by accident. The obvious danger which the R.F.C. pilots cheerfully face in flying in the vicinity of our own barrage fire is only an additional example of the devotion with which every kind of duty is undertaken by them.

Incidentally, it seems time that the authorities defined the rights and limitations of the volunteer street patrols, who, in the poorer classes of London, take it in turn to promenade the streets in order to give the local inhabitants due notice of air-raid warnings. There is reason to believe that on the occasion of the last raid, in certain districts unwarrantable alarm was created by unauthorised reports of a second air-raid warning after the All-clear notice had been issued. It is alleged that certain of these patrols, entirely on their own responsibility, knocked up the whole of their clientèle and everyone else in the vicinity, and even went to the length of blowing police whistles.

CIVIL AERIAL TRANSPORT.

The "Petit Parisien" of Dec. 11th publishes an interview with M. d'Aubigny, Deputy President of the Inter-Ministerial Civil Aeronautic Commission, on the subject of the establishment of a postal aerial line between France and Great Britain.

M. d'Aubigny declared that the project, which was approaching realisation, would be very useful during the war, as it would put the members of the Inter-Allied Committee at Versailles into rapid communication with the British Government.

"The idea," said M. d'Aubigny, "was conceived before the Rapallo Agreement, and M. Flavdu was entrusted with a mission to the British Government to consult with the Air Board. At the same time, the Minister of Commerce empowered the Director of the Postal Services to negotiate with the Post Office for a Postal Convention.

"The agreement in principle has been settled, and it is now a matter for the British Government to arrange the definite agreement, and this will not be long delayed, as the present British Air Minister is the brother of Lord Northcliffe, and is known for his promptness in dealing with affairs."

THE WORK AND TRAINING OF THE R.N.A.S.

The proprietors of the "Illustrated London News" have produced a souvenir publication of the Work and Training of the Royal Naval Air Service, under the authority of the Admiralty, on lines similar to those of an earlier publication called "The Work and Training of the Royal Flying Corps."

The new publication contains a short preface by the Rt. Hon. Sir E. Geddes, G.B.E., K.C.B., M.P., First Lord of the Admiralty.

The review is purely pictorial in character and illustrates the various operations which involve the use of land machines, seaplanes, kite-balloons, and airships of all kinds.

From a technical point of view, the most interesting reproductions are photographs showing a tractor-seaplane carrying a torpedo and a twin-tractor, twin-fuselage seaplane, embracing many features found in Wight machines. There are also some extremely good photographs of the bombardment of Bayrout, from what would appear to be precariously low altitudes.

Naturally, in a publication of this character, it is not practicable for any very up-to-date photographs to be reproduced, and those who are closely in touch with naval aeronautics must not expect too much in the way of anything very new. Nevertheless, the review is very well worth the price of 2s. 6d.

Should difficulty be found in obtaining copies locally, orders should be sent to the William Dawson Publishing Co., Ltd., Rolls House, Breams Buildings, E.C.4, enclosing 2s, 9d. for each copy required.

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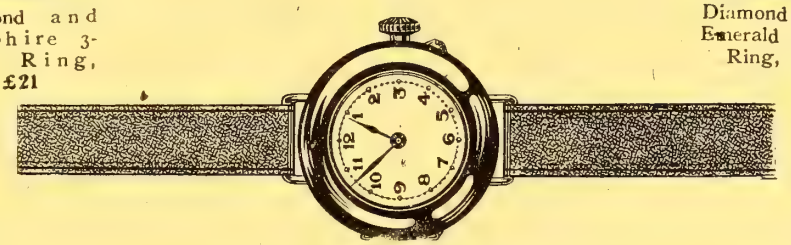
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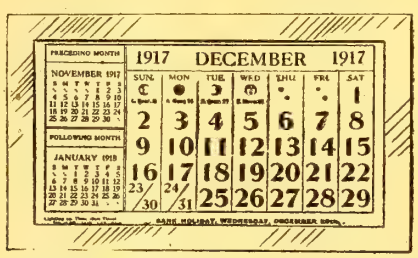
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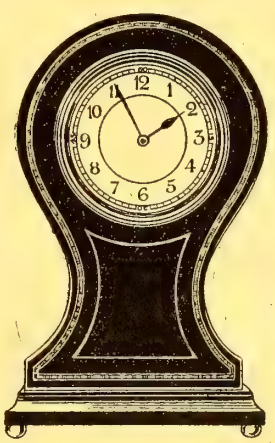
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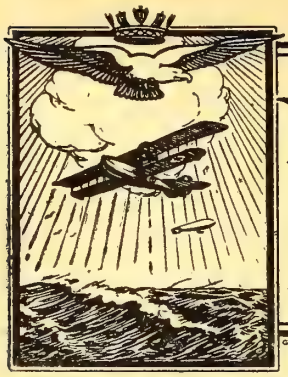
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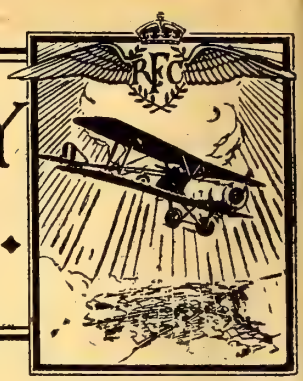
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NAVAL and MILITARY AERONAUTICS



Owing to the coincidence of Christmas and the usual press day a number of the "Gazettes" and certain other official information are held over until the following week.

FROM THE "LONDON GAZETTE."

Admiralty, Dec. 11th.

Dec. 13th.—R.N.A.S.—To be temp. Sqdn. Comdr.:—W. F. Vernon, Dec. 10th.

Dec. 14th.—R.M.—H. L. Wood (from Ldg. Aircraftman, R.N.A.S.) to be temp. Sec. Lt., Dec. 6th.

War Office, Dec. 17th.

The King has been pleased to approve of the award of the Military Medal for bravery in the Field to the following non-commissioned officer and men:—

88288 Serjt. W. J. Benger, R.F.C. (Ewell).
45211 1st Class Air Mech. C. S. Britten, R.F.C., attd. R.G.A. (Brondesbury, N.W.).
10500 1st Class Air Mech. W. Morgan, R.F.C. (Treharris, Glam.).
78563 1st Class Air Mech. A. G. J. Whitehouse, R.F.C. (Northampton).

* * *

The King has been pleased to approve of the award of the Meritorious Service Medal to the following non-commissioned officer for gallantry in the performance of military duty:—

2546 Serjt. W. F. Parke, R.F.C. (Gt. Leigho).

* * *

The King has been pleased to approve of the award of the Meritorious Service Medal to the following warrant officers and non-commissioned officers, in recognition of valuable services rendered with the Armies in the field during the present war:—

1655 Serjt. (A./Flt. Serjt.) F. F. W. Darke, R.F.C. (Guildford).
7677 Flt. Serjt. (T./S./M.) L. R. Fears, R.F.C. (Kennington, S.E.).
1267 Serjt. R. J. H. Holland, R.F.C (Branksome).
4384 Serjt. G. E. J. Horwood, R.F.C. (Campden).
12128 Serjt. (A./Flt. Serjt.) J. W. Large, R.F.C. (Peckham, S.E.).
2021 Serjt. A. Leslie, R.F.C. (Bucksburn, N.B.).
3306 Serjt. (A./Flt. Serjt.) H. H. Medham, R.F.C. (Nechells).
5775 S./M. H. W. Prickett, R.F.C. (Small Heath).
662 Flt. Serjt. W. Simpson, R.F.C. (Sunderland).
11778 Flt. Serjt. W. Swinburn, R.F.C. (Sheffield).

Australian Imperial Force.

A/296 Serjt. L. Horscroft, Aust. F.C.
A/332 Flt. Serjt. H. Johnston, Aust. F.C.
A/105 Flt. Serjt. R. S. Robertson, Aust. F.C.

* * *

The following are among the decorations and medals awarded by the Allied Powers at various dates to the British Forces for distinguished services rendered during the course of the campaign. The King has given unrestricted permission in all cases to wear the decorations and medals in question:—

Presented by the President of the French Republic.

Croix de Guerre.

Lt. (temp. Capt.) W. L. Birch, W. Yorks R. and R.F.C
Sec. Lt. (temp. Lt.) J. H. Broadway, Dorset R. and R.F.C.
Sec. Lt. D. A. Glen, late R.F.C.
Temp. Sec. Lt. H. A. Jones, Wilts R. and R.F.C.
Sec. Lt. (temp. Lt.) J. W. D. Leigh, North'n Cyclist Bn. and R.F.C.
Sec. Lt. (temp. Lt.) F. W. H. Thomas, Staffs Yeo. and R.F.C.
Temp. Capt. Sir D. J. Wernher, Bt., A.S.C., attd. R.F.C.

Legion d'Honneur.

Croix d'Officier.

Maj. (temp. Brig.-Gen.) J. H. W. Becke, D.S.O., Notts and Derby R.
Temp. Lt.-Col. the Hon. A. S. Byng, Gen. List and R.F.C.

Croix de Chevalier.

Capt. I. P. R. Napier, Arg. and Suthd. Highrs. and R.F.C.

War Office, Dec. 18th.

REGULAR FORCES.—Staff.—The following temp appt. is made at the War Office:—Staff Lt.—Sec. Lt. T. D. Bucknill, R.F.C., Spec. Res., from an Equipt. Officer, 3rd Cl., Sept. 28th.

* * *

The King has been pleased to confer the following rewards in recognition of gallantry and distinguished service in connection with anti-aircraft services in the United Kingdom:—

A Bar to the D.S.O.

Temp. Capt. G. W. M. Green, D.S.O., M.C., Gen. List, R.F.C.

The Distinguished Service Order.

Lt.-Col. W. M. Thompson, R.E.
Temp. Capt. W. H. Haynes, R.F.C.

The Military Cross.

Sec. Lt. F. A. D. Grace, S.R., R.F.C.
Temp. Sec. Lt. G. Murray, Gen. List, R.F.C.
Temp. Sec. Lt. T. B. Pritchard, late Gen. List and R.F.C.

The Military Medal.

No. 564555 Sap. R. E. Fraser, R.E.
No. 23555 Ftr. J. Horner, R.G.A.

* * *

The King has been pleased to confer the Albert Medal on Flt. Lt. Edward Peverall Meggs Davis, R.N.A.S. The following is the account of the services in respect of which the decoration has been conferred:—

On Oct. 3rd, 1917, whilst carrying out a practice flight, a seaplane, piloted by Flt. Sub-Lt. James Douglas Grant, fell into the sea. The seaplane turned over and the pilot was enclosed in the boat under water. Flt. Lt. Edward Peverall Meggs Davis immediately flew a seaplane to the position of the accident, made fast to the wreck, and dived under the wreck in his uniform and endeavoured to extricate Flt. Sub-Lt. Grant.

To do this it was necessary for him to dive amongst, and struggle through, the mass of wires and broken parts of the wreck. Notwithstanding the imminent danger of being caught up amongst them, Lt. Davis continued his efforts to get Flt. Sub-Lt. Grant out, until the emergency boat arrived on the scene. No other help was at hand until the arrival of this motor-boat, which at the time of the accident was about a mile and a half away.

Flt. Lt. Davis risked his life in endeavouring to save that of his brother officer, as there was every chance of his becoming caught under water in the wires of the wreck.

War Office, Dec. 19th.

REGULAR FORCES. — Establishments. — R.F.C. — Mil. Wing.—Brig.-Maj.—Lt. (temp. Capt.) W. L. Birch, W. York. R., T.F., from a Staff Officer, 3rd Cl. (graded as Staff Capt.), and to retain his temp. rank while so empld., Sept. 15th.

Staff Officer, 2nd Cl. (graded for pay as a Brig.-Maj.).—The

(*Continued on page* 1928).

THE SPECIAL NAVAL AND MILITARY ISSUES.

As usual, the Special Naval and Military Issues of "The Aeroplane" will be published at the beginning of the New Year, the Naval Issue on Jan. 2nd and the Military Issue on Jan. 9th. They will contain a Review of the Year 1917, the Honours Lists of the Flying Services, and special articles and illustrations dealing with Service matters. Owing to restrictions on the paper supply, the number printed has to be strictly limited, so readers will find it advisable to place their orders well in advance, either through their newsagents or direct with the Publishers, The Wm. Dawson Publishing Co., Ltd., 2, Breams Buildings, E.C.4. The price will be 3d. as usual, or 4d., post free.

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The 230 h.p. Benz Engine.

(Continued from page 1836.)

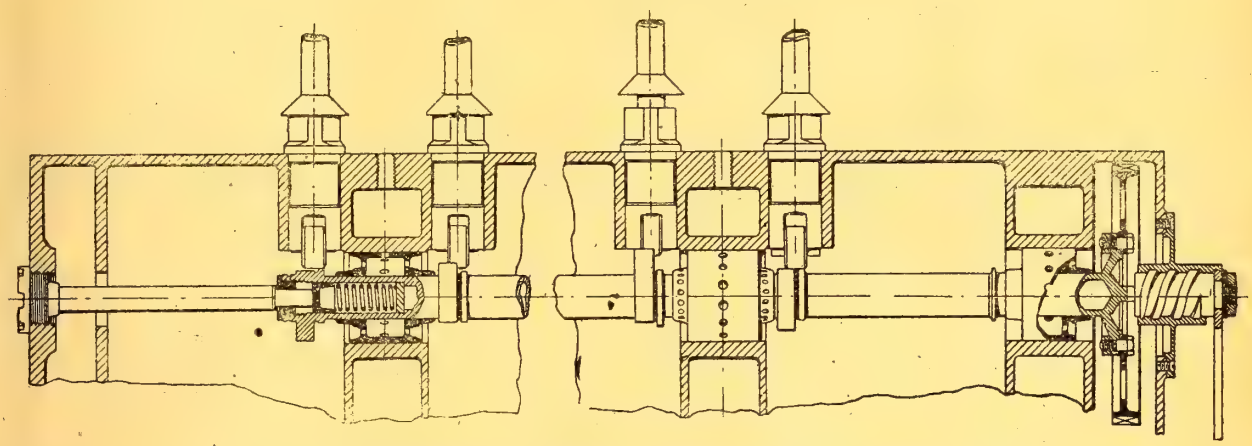


Fig. 15.—Arrangement of Exhaust Camshaft and Half Compression Gear.

Camshafts.—The hollow camshafts each run in three plain phosphor-bronze bearings, and are arranged inside the top half of the crank-chamber. The camshaft bearing bushes, which are hollow, are 53 mm. outside diameter, and are split on the camshaft axis and held together by wire rings on either side to allow the camshafts to be easily inserted in the crank case. The bearings are located by grub screws screwed in from the outside of the crank-chamber.

The camshafts are driven by gears from the intermediate gear wheel which meshes with the crankshaft distribution pinion, and arranged inside a casing formed at the rear end of the crank case. The camshaft gears are bolted to the camshafts by drilled flanges, which provide a vernier adjustment for setting the camshafts.

Half compression cams are arranged on the exhaust camshaft in the usual manner. The lateral movement of the floating camshaft is effected by a small lever at the rear end of the crankcase which operates a two start square thread screw of 24 mm. pitch. The camshaft is returned to its normal running position by a spring arranged inside the front end of the hollow camshaft. Further details of this half compression gear are shown in Fig. 15.

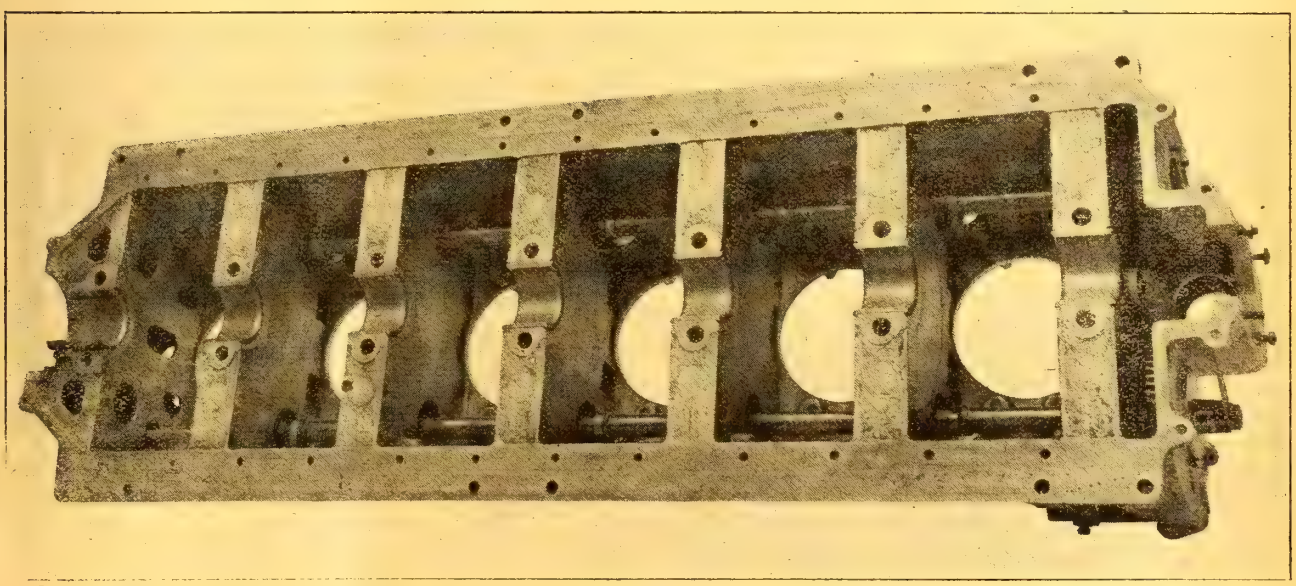


Fig. 16.—Cylinder Section of Crankcase

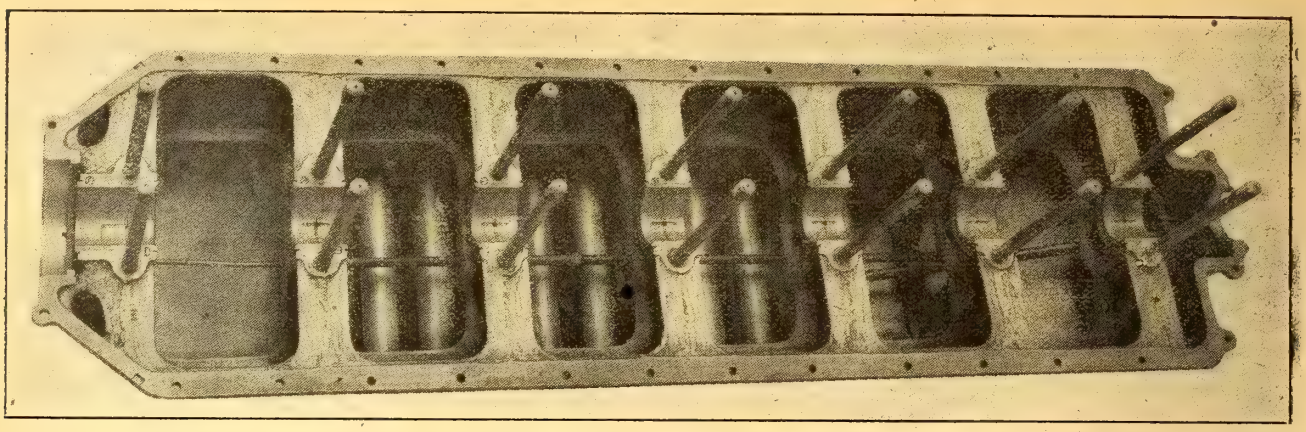


Fig. 17.—Bottom Section of Crankcase Viewed from Above.

The half compression cams open the exhaust valves at 35° E., and close 22° L.

Crankcase.—The general design of the crankcase is shown in the longitudinal and cross sectional drawings of the engine (Figs. 4 and 5). The other details are clearly shown in the photographic views of the top and bottom halves (Figs. 16 and 17).

The method of cooling the interior of the crank-chamber and sump indicates the fact that this matter has received most careful consideration in design. In the top half of the crankcase six of the seven main bearing housings are cast so that the webs form air passages transversely across the engine. Two of these passages form the air intake passages for the two carburettors—similarly to those of the 160-h.p. Benz engines—as already stated. A section through one of these passages is shown in Fig. 19.

The bottom half of the crank-chamber is extended to form an oil sump and is of unusual design. The lower portion is cooled by eighteen 30-mm. aluminium tubes fixed transversely across the base chamber, the air being scooped into the cooling tubes by a large sheet aluminium louvred cowl on the induction side of the engine. A corresponding but reversed cowl is fitted on the exhaust side.

Breathers are also fitted into the top half of the crank-chamber. The simple type of wire spring clip fitted to the breathers should be noted.

Carburation System.—Two separate carburettors are fitted each feeding three cylinders. These are attached by flanges to the side of the top half of the crank-chamber.

Referring to the sectional drawing of the carburettor (Fig. 19) it will be seen that the pilot jet is formed by an extension of the brass tube into which the main jet is screwed.

This combined jet is screwed obliquely into the bottom of the float chamber casting and not into the body of the carburettor. The float chamber is attached to the body of the carburettor by

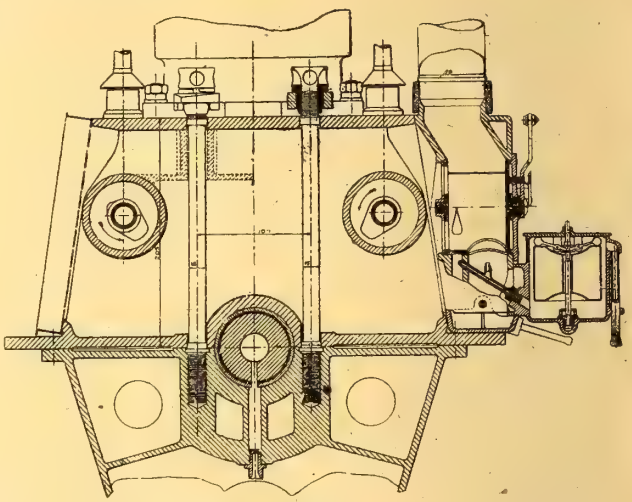


Fig. 19.—Arrangement of Carburettor, and Section through Air Intake Passage in Crankcase.

two bolts, and the throttle is of the horizontal barrel type. The details of the detachable float chamber and jets and the throttle are clearly shown in Figs. 20 and 21.

As already mentioned, the main air intake passages are cast in the crank-chamber between the webs of the main bearings, air entering each carburettor through two ports cut in the end of the throttle, and also through the air passage at the base of the carburettor below the jets.

At full throttle most of the air is taken through the air ports

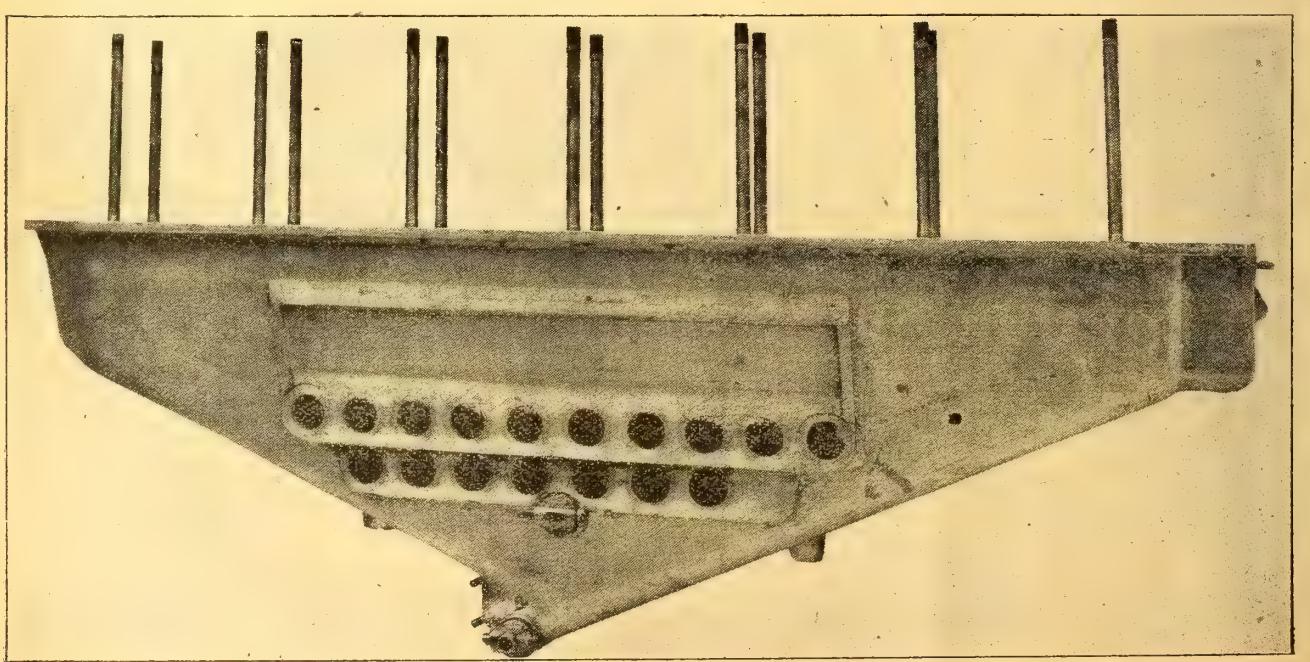


Fig. 18.—Side View of Bottom Section of Crankcase, showing Air Tubes for Cooling.

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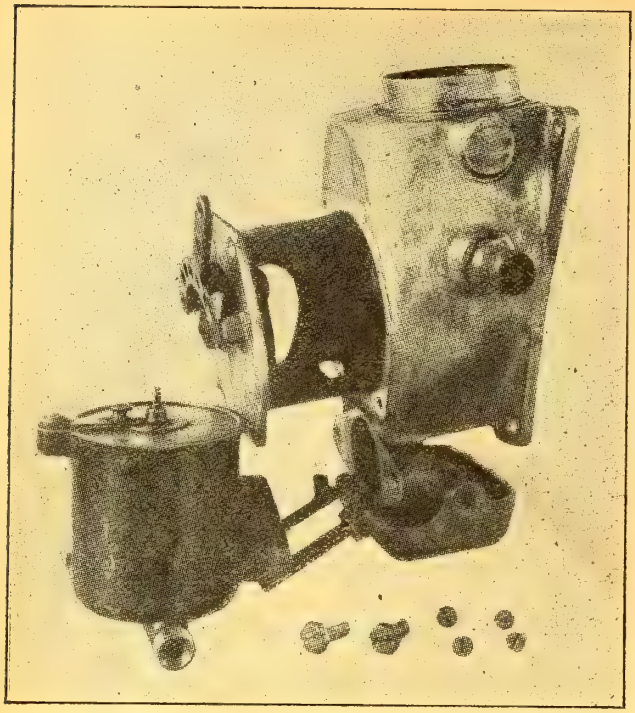


Fig. 20.—Carburettor, with Throttle and Float Chamber detached.

in the throttle above the jets. When the throttle is closed for slow running the main jet is completely cut off, and all the air is taken through the passage containing the pilot jet. The slow running of the engine is very good.

The design of the air intake ports in the end of the throttle are clearly shown in the photographs (Figs. 22 and 23), which show the throttle in the half and full positions. These ports are so designed that the petrol-air ratio remains practically constant over a wide range of throttle opening up to nearly half throttle, the last movement of the throttle, however, causes no increase in petrol flow, but on the contrary a slight decrease.

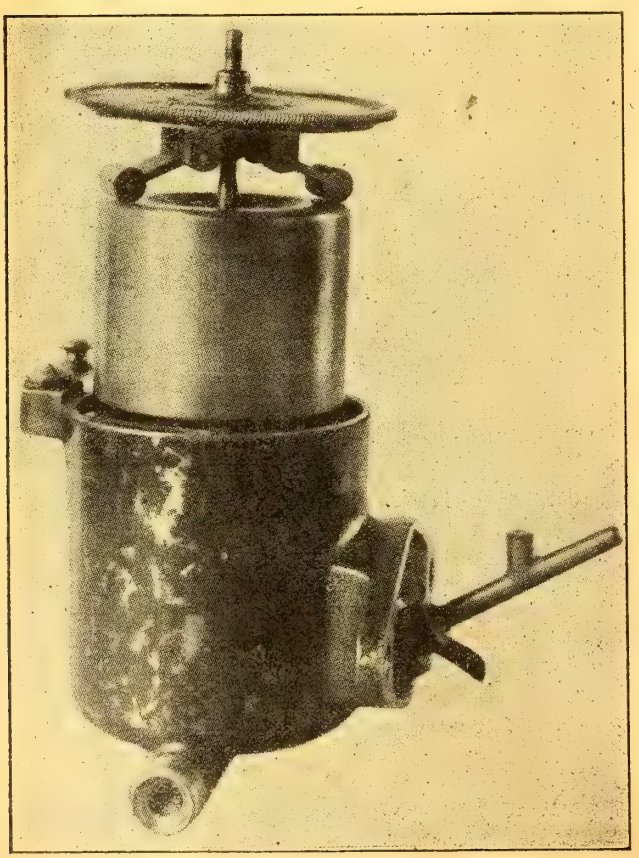


Fig. 21.—View of Float Chamber, showing Jets.

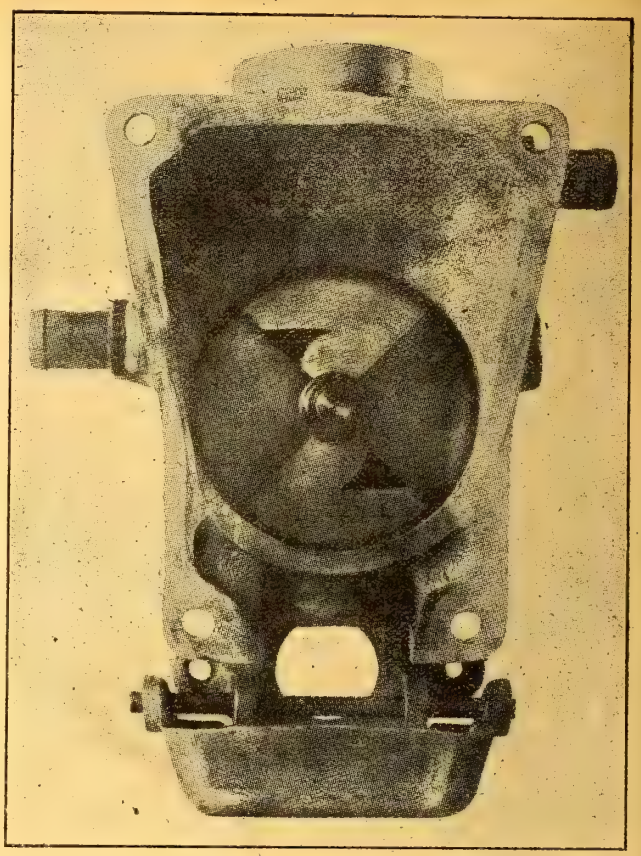


Fig. 22.—Back View of Carburettor, showing Air Intake at half-throttle.

No compensating arrangement is fitted for high altitude control. The body of the carburettor around the throttle is water jacketed, and is connected by an arrangement of steel piping to the delivery of the water pump, and also to the lower water connections at the bottom of the water jackets between each pair of cylinders. The arrangement is clearly shown in the side view of the engine (Fig. 2). (Published in last week's issue.)

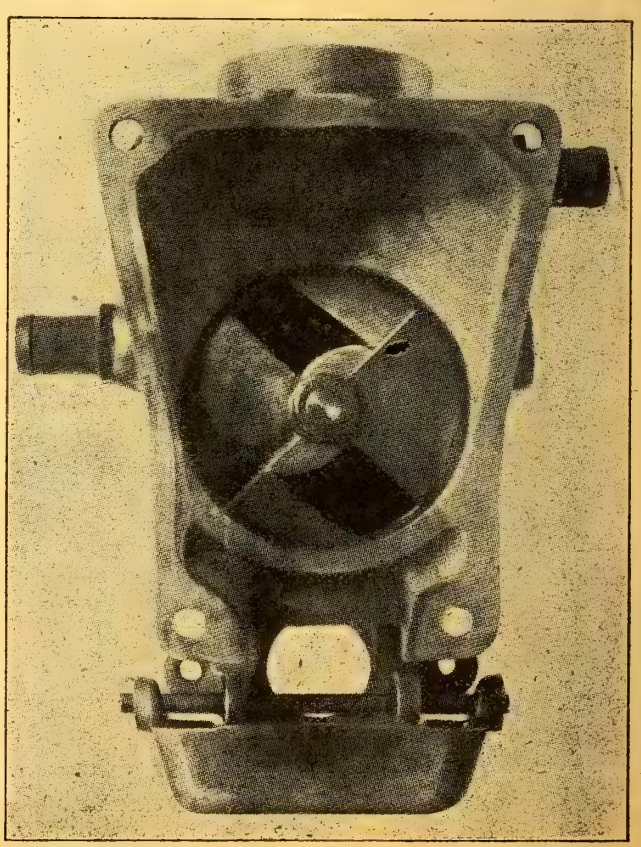


Fig. 23.—Back View, showing Air Intake at Full Throttle.

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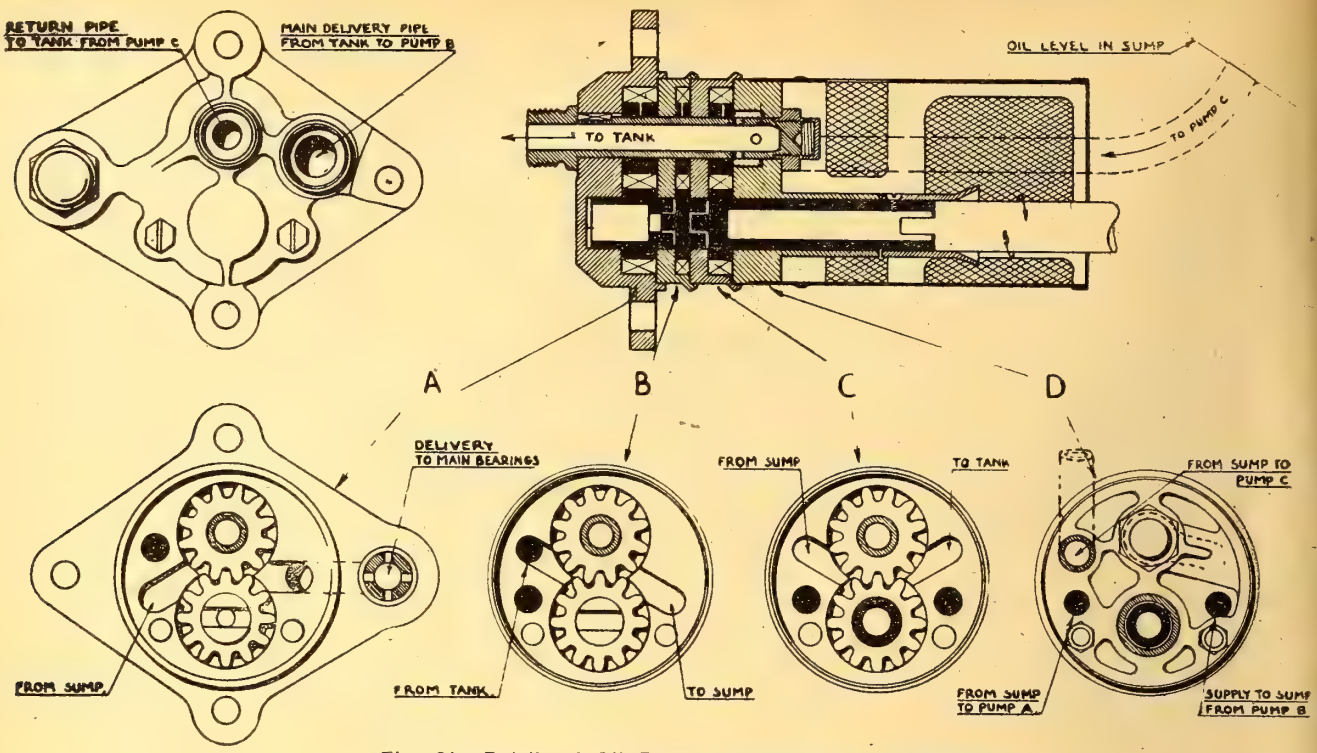


Fig. 24.—Details of Oil Pump, showing Gear Arrangement.

The design of the branched induction pipes is interesting. These are built up of aluminium tubes with cast aluminium flanged bends, and weigh only 2.625 lbs. each complete with connections. The internal diameter of the induction pipe =58 mm.

The R.A.F. test report which follows computes the petrol consumption at 150 pints per hour =0.65 pints per B.H.P. hour.

The connections between the flanged bends of the induction pipes and the cylinders, and also between the bottom ends of the induction pipes and the carburettors are made with rubber ring joints secured by wide band clips as shown in Fig. 1.

These joints, when loosened, being more or less flexible, allow any one of the cylinders to be removed without disturbing the other joints of the induction branched pipes.

Lubrication.—Pressure feed lubrication to the crankshaft and connecting rod bearings is efficiently carried out by an exceptionally small high-speed gear pump working submerged in the reservoir formed in the bottom of the sump. The oil pump is virtually a triple gear pump with three functions. Details of this oil pump are shown in the sectional drawings (Fig. 24), and in the photographs of the parts (Figs. 25 and 26).

The oil pump works diagonally in the sump and is driven by a long shaft and gear wheel which meshes obliquely with the distribution pinion on the rear end of the crankshaft.

The functions of the triple oil pumps are as follows:—

Oil is drawn by the main pressure pump A (Fig. 24) from the reservoir in the sump through the holes in the end cover of the pump, lubricating the main bearings through the main oil pipe and the small branch pipes and hollow crankshaft, thence to the gudgeon-pin bearings through the small pipes inside the tubular connecting rods. The surplus oil is thrown out from the hollow cranks onto the camshafts, etc., and returns by gravity to the sump, flowing over the air cooling pipes in the base. The fresh oil is fed into the sump reservoir by the small suction pump B from the oil tank, whilst the correct working oil level is maintained in the reservoir by the gear pump C, the oil being drawn off through the bent pipe E, and returned to the oil tank. The fresh oil from the oil tank passes through a cylindrical gauze filter, which is attached to the under side of the crank-chamber.

The complete oil pump with its filter is easily detachable from the sump by the studs through the flange, as shown in the cross sectional drawings of the engine (Fig. 5). A small spring loaded ball is used as an oil pressure release valve in the main oil supply pipe.

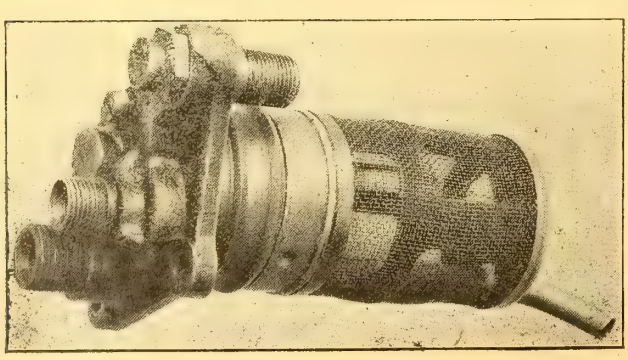


Fig. 25.—View of Oil Pump Complete

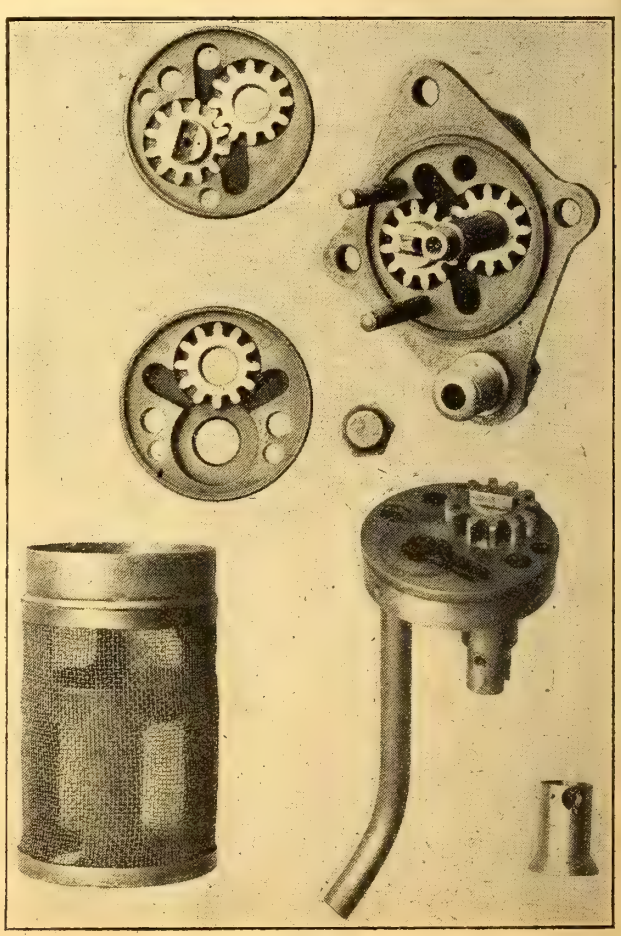


Fig. 26.—Parts of Oil Pump.

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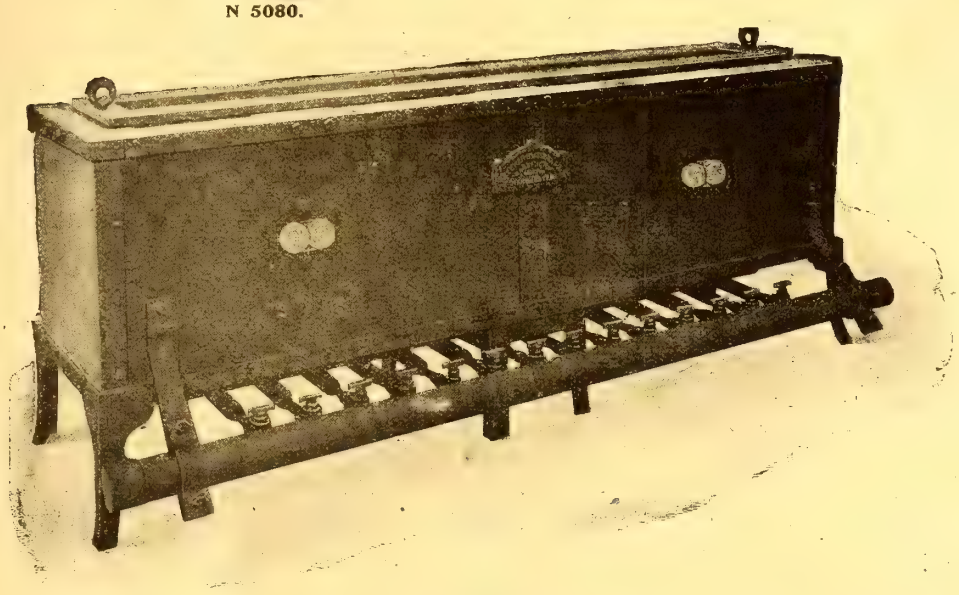


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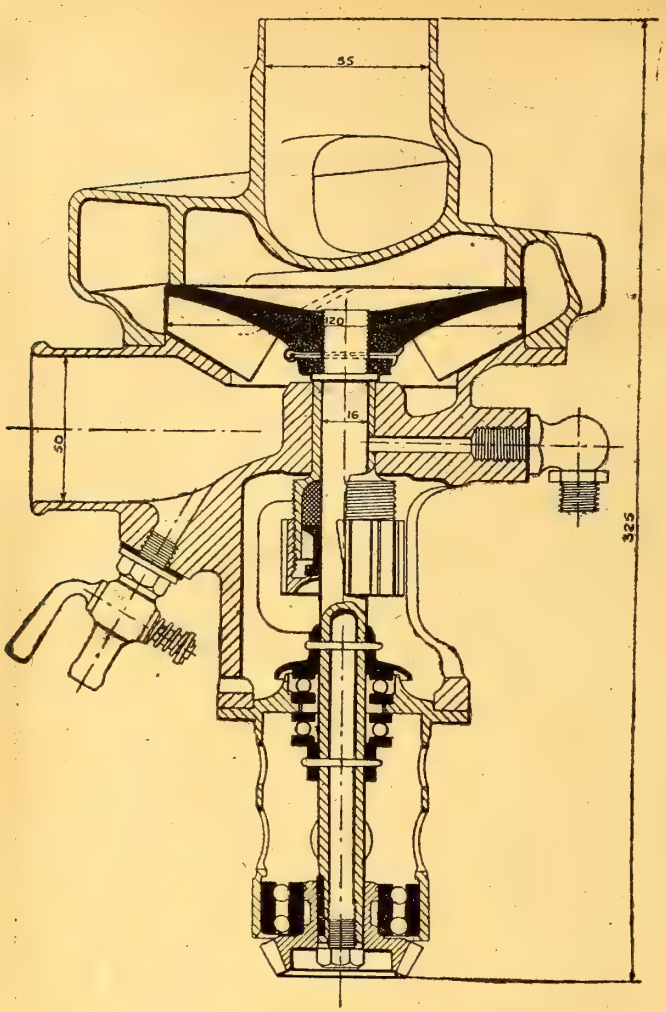


Fig. 27.—Arrangement of Water Pump.

The gears of the oil pumps and also the pump body are of cast-iron, and the weight of the complete pump = 2.89 lbs.

Oil consumption during R.A.F. test is stated to be 4.5 pints per hour = 0.02 pint per B.H.P. hour.

Oil pressure = 50 lbs. maximum, 28 lbs. normal.

Ignition.—Two Z.H.6 magnetos are mounted on brackets at the rear end of the crankcase, and are driven directly off the camshaft gear wheels. The design of this magneto drive is very neatly carried out, and is clearly shown in the rear end view of the engine (Fig. 1). The contact breakers of the magnetos are advanced or retarded by small toothed quadrants which mesh with teeth cut in the underside of the cam box, and the interconnected levers of the timing advance quadrants are coupled by a rod which passes through the end of the crankcase casting.

Two sparking plugs are fitted to each cylinder, one on each side, and the H.T. wires are carried in a sheet aluminium casing attached to the cylinders.

The ignition is timed as 30° E fully advanced = 18 mm. on stroke.

Water Cooling.—The centrifugal water pump is situated on the top of the rear end of the crank-chamber, and the vertical spindle of the rotor is driven by bevel gears off the camshaft intermediate pinion, as shown in the sectional arrangement drawing of the engine (Fig. 4).

The speed of the water-pump spindle = 1.58 to 1 of the crankshaft and the diameter of the rotor = 120 mm.

The diameter of the water inlet to the pump is 50 mm. and the diameter of the outlet is 55 mm. The water enters at the top of the rear cylinder through the steel tube elbow, and as previously mentioned is deflected onto the exhaust passages of each cylinder. The pump spindle is fitted with a double thrust ball race, and is provided with a large stuffing gland, and the spindle is lubricated by a grease lubricator operated from the pilot's seat.

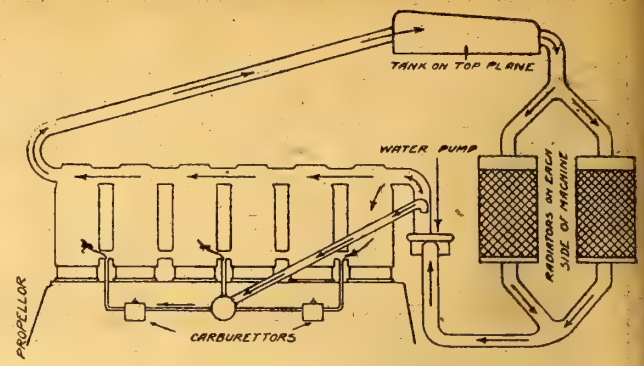


Fig. 28.—Diagram of Water Cooling System.

From a test of this water pump carried out at the Royal Aircraft Factory, with the pump removed from the engine and coupled to an electric motor, the following results were obtained:—Running at an average speed of 2,100 r.p.m., equivalent to 1,325 r.p.m. of the crankshaft. The maximum delivery = 120 gallons per minute with free outlet, and the minimum delivery = 48 gallons per minute against a pressure of 7 lbs. per square inch.

The complete water-cooling system is given in the diagrammatic sketch (Fig. 28), which shows the connections between the cylinders, water pump and the twin radiators, and also the small water tank which is attached to the top plane of the machine. From this it will be seen that the greater part of the water is forced by the pump directly through the cylinder heads in series whilst the bottom portion of the cylinder water jackets is supplied through a branch pipe from just above the outlet of the water pump. This branch pipe is also connected to the carburettor water jackets as shown in the diagram.

The water connections between the heads of the cylinders are rubber rings which are contracted into the semi-circular joints by steel band clips of ingenious design. The clips are made of thin strips of annealed spring steel; these are wound twice round the rubber rings and fastened by small steel links and bolts. In starting to make this joint, the end of the steel band is first bent over the bottom bar of the connecting link and then wound twice round the rubber ring, the free end of the steel band passing through the centre portion of the connecting link on the second winding. The end of the steel band is then fastened to the top end of the link by coiling the end several times round a small bolt in the head of the link, the end of the steel band being bent over for about 2 mm. and inserted into a slot cut in the bolt, so that by turning the bolt in the link the steel band is wound tightly round the ring joint and, owing to the position and shape of the link, remains fixed.

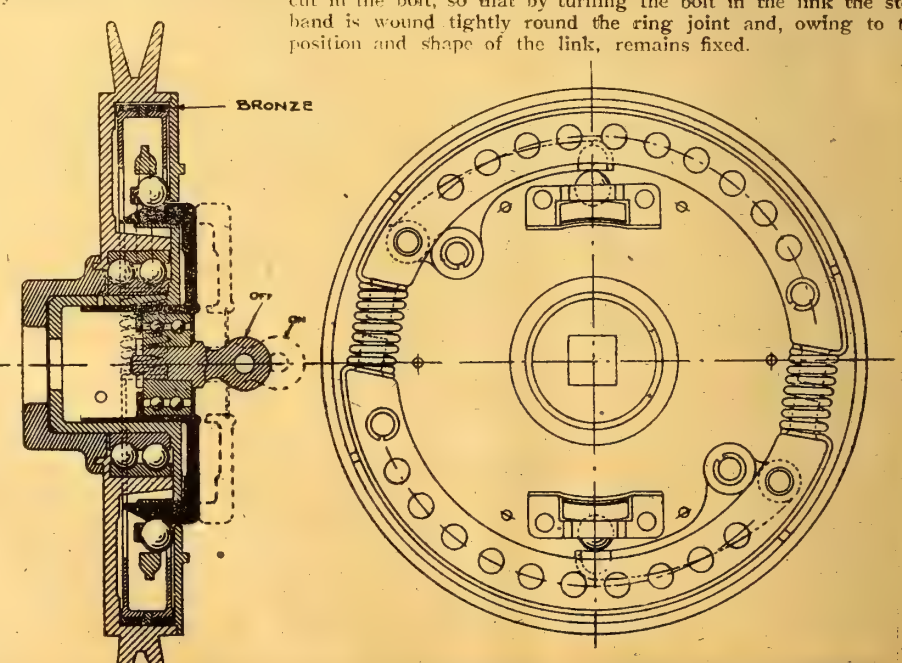


Fig. 29.—Arrangement of Wireless Drive and Friction Clutch.

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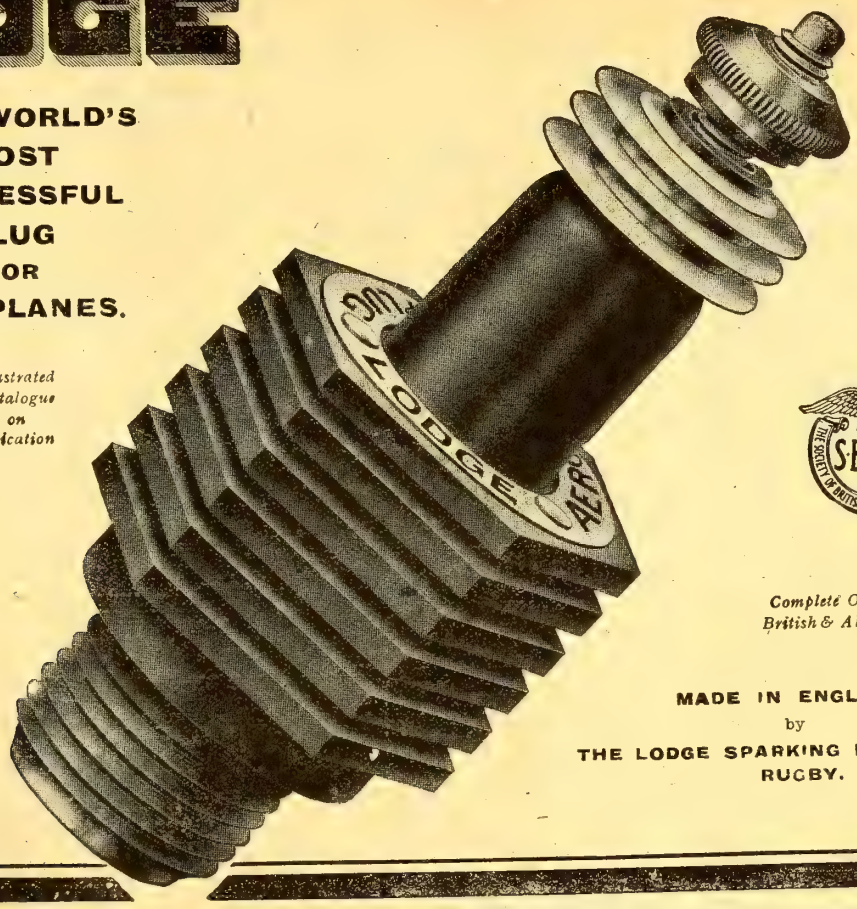
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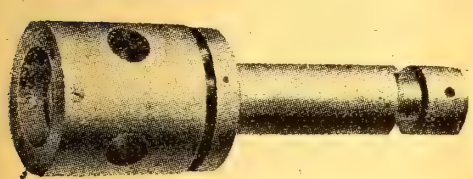
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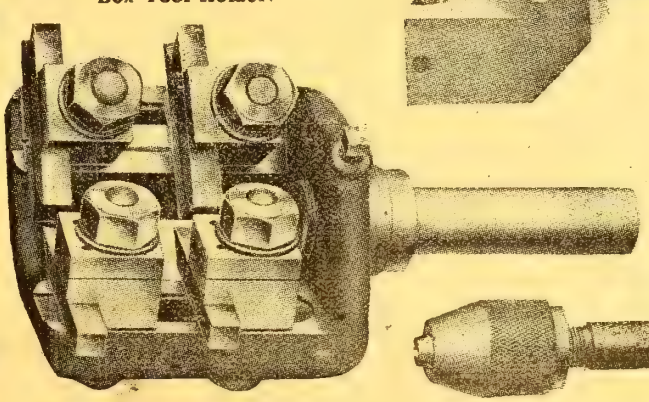
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The Aircraft Construction Co., Harlev Works, Beckton Road, E.16. "Aercracons, Canning, London." East 1300
Thompson Bros., Ltd., Bradley, Bilston. "Thompson Bros., Bilston." Bilston 10.
Wooler Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10.

Metal Shearing Tools—
Montgomery, Smith, & Co., Ltd., Tangent Works, Keynsham, near Bristol. "Ingenuity, Saltford." Keynsham 21.

Metal Spinnings—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Metric Bolts—
Cashmore Bros., Zota Works, Hildreth Street, Balham, S.W. Battersea 415.
Rubery Owen & Co., Darlaston, South Staffs.

Miscellaneous—
Anderson, D., & Son, Ltd. (Roofs), Belfast. "Anderson, Belfast." Belfast 4033-4034-4035.
Anti-Glare Glass Co., Ltd., 76, Turnmill Street, E.C. Central 3731.
Bowden Wire, Ltd., Willesden Junction, "Bowirelim, Harles, London." Willesden 2400 (3 lines).
British Metal (Kingston), Ltd., Kingston-on-Thames.
Brown Bros., Ltd., Great Eastern Street, E.C.1. "Imbrowned, Bethroad, London." London Wall 6300.
Endolithic Manufacturing Co., Ltd., 61½, Fore Street, London, E.C.2. Labels in Metal, Ivory, Ivorine, etc.
Herbert Frood Co., Ltd., Chapel-en-le-Frith. "Frodobrake, Birmingham." Central 793.
Glasso Manufacturing Co., Ltd., 211, City Road, E.C. City 0558.
London Label Co., Ltd., Harley Works, Beckton Road, E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.
MacLennan, J., & Co., 30, Newgate Street, E.C.1., and at Glasgow. Tapes, Cords and Threads. City 3115.

Motor Cars—
Arrol Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.
Mann, Egerton & Co., Ltd., 379/381, Euston Road, London, N.W.1. "Manegecar, Eusroad, London." Museum 70.
Standard Motor Car Co., Coventry. "Flywheel, Coventry." Coventry 530 (4 lines).

Nameplates and Labels—
British Metal (Kingston), Ltd., Kingston-on-Thames
Endolithic Manufacturing Co., Ltd., 61½, Fore Street, London, E.C.2.
The Clegg Metal Engraving Co., Chatsworth Works, Worthing. "Clegg Worthing."

Observation Panels—
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Parachutes—
E. R. Calthrop's Aerial Patents, Ltd., Eldon Street House, Eldon Street, London, E.C. "Savemalivo, Ave, London." London Wall 3266-3267.

Patent Agents—
King's Patent Agency, 165, Queen Victoria Street, E.C.4. Central 682.
Page & Rowlingson, 27, Chancery Lane, E.C.4. Central 332.
Stanley Popplewell & Co., 38, Chancery Lane, W.C.2. Central 1763.

Pattern Making—
Fredk. Ward, 6, 7 and 8, Allsop Street, Upper Baker Street, W. Padd 4743.

Petrol Storage (Bulk)—
Bywater & Co. (The Hydraulic System), Craven House, Kingsway, London, W.C.2. "Bywaterist, London." Gerrard 2220.

Piston Rings—
British Chuck & Piston Ring Co., Coventry. "Rings, Coventry." Coventry 723.

Power Presses and Dies—
Bliss, E. W., & Co., 2a, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon, London." Hop 4340.

Presswork—
Rubery Owen & Co., Darlaston, South Staffs
Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851
Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.
Integral Propeller Co., Ltd. "Aviprop, Hyde, London." Hendon 9. Kingsbury 104.
Lang Propeller, Ltd., Weybridge. "Aerosticks, Weybridge." Weybridge 520-521.
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 291, Leeds.
Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

Pyrometers—
The Foster Instrument Co., Letchworth, Herts. Foster Instruments, Letchworth. Letchworth 26.

Rigging for Aircraft—
Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466 (3 lines).

Rubber Tubing & Accessories—
Hancock, James Lyne, Ltd., 266, Goswell Road, London, E.C.1. "Masticator, Isling, London." City 3811 and 3812.

Safety Belts—
Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432.

Seaplane Manufacturers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay, 345 (3 lines).
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.
Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.
Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton." Southampton 1337.

Searchlights and Landing Lights—
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Seats for Aeroplanes—
Bowser, E., Art Cane Works, 50 Park Lane, Leeds. Central 3437.

Shackles—
The British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow. "Golshel, Hounslow." Hounslow 254.

Sheet Metal Pressings—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.
W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk, Bham." Central 550.
British Metal (Kingston), Ltd., Kingston-on-Thames.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 497 Birmingham.
Rubery Owen & Co., Darlaston, South Staffs.

Sheet Metal Work—
Thames.
British Metal (Kingston), Ltd., Kingston-on-
Evans, Joseph, & Co., Ltd., Liverpool Street Mills, Birmingham. "Adept, Birmingham." Central 733 (3 lines).
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Rubery Owen & Co., Darlaston, South Staffs.
The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.

Shock Absorbers (Elastic Cord)—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Sparking Plugs—
Forward Motor Co., Summer Row, Birmingham. Central 6250.
Hobson Manufacturing Co., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670.
Lodge Sparking Plug Co., Ltd., Rugby. "Igniter, Rugby." Rugby 235.
Ripault, Leo, & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758.

Stampings—
Avenue 1432.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3.

Springs—
Dart Spring Co., West Bromwich. "Dart, West Bromwich." West Bromwich 322.
Gabriel & Co., 4 and 5, A B Row, Birmingham: "Gabriel, Birmingham." Central 1223.
Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Steel—
Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.
Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham." Smithwick 224.

Steel Tension Wires—
Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466

Steel Tubes for Aeroplanes—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Taper Pins—
Mountford, Fredk. (Birmingham), Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262.

Tapes and Smallwares—
Brown, Percy, & Co., 49, Newgate Street, London, E.C.1. "Ominate, Cent, London." City 4650.
MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.
James North Hardy & Son, Ltd., 54, Portland Street, Manchester. "Hardson, Manchester." Central 6471.

Timber—
Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Entikosil, Vic, London." Victoria 5073, 4210.
Brown, R. F., & F. W., Wollaton Saw Mills, near Nottingham. "Brown's Saw Mills, Wollaton." Nottingham 1526.
J. Owen & Sons, Ltd., 199a, Borough High Street, S.E.1. "Bucheron, London."

Time Recorders— Hop 3811 (2 lines).
Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310.

Turnbuckles—
Rubery Owen & Co., Darlaston, South Staffs.

Tyres and Wheels—
The Palmer Tyre, Ltd., Shaftesbury Avenue. "Tyricord, Westcent." Gerrard 1214 (5 lines)

Varnishes—
Clark, R. Ingham, & Co., Caxton House, S.W.1. "Pearline, Vic, London. Victoria 2923.
Harland, W., & Son, Merton, London, S.W.19. "Harland, Wimbledon 45." Wimbledon 45 and 1395.
Naylor Bros., Ltd., Southall, Middlesex. "Naylor, Southall." Southall 30.

Washers— Avenue 1432.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3.
Herbert Terry & Sons, Ltd. Redditch. "Springs, Redditch." Redditch 61.

Watchmakers and Jewellers (Silver Models)—
Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 0091 (3 lines).

Welding and Cutting Plant—
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Welding Repairs—
Barimar, Ltd., 10, Poland Street, W.1. "Barimar, Reg, London." Gerrard 8173.
The New Welding Co., 26, Rosebery Avenue, London, E.C.1. "Windoneeda, Holb, London." Holborn 5252.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London."

Wind Shields— 3540 Victoria (3 lines).
Auster, Ltd., 133, Long Acre, W.C. "Winflector, London." Regent 5910.
London Label Co., Ltd., Hadley Works, Beckton Road, E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Wire Gauze—
N. Greening & Sons, Ltd., 16, Finsbury St., London, E.C.2. "Setscrew, Finsquare, London." London Wall 1082.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

Wires and Cables (Aeroplanes)—
Bruntons, Musselburgh, Scotland. "Wiremill, Musselburgh." Musselburgh 28.
Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466 (3 lines).

Wirework—
Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Woodworking Machinery—
Robinson, Thomas, & Son, Ltd., Railway Works, Rochdale. "Robinson, Rochdale." Rochdale 467.
Sagar, J., & Co., Ltd., Halifax. "Sawtooth, Halifax." Halifax 136.
Wadkin & Co., Leicester. "Woodworker, Leicester." Leicester 3614.

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Acetylene Welding Plant—
Acetylene Corporation of Great Britain, Ltd., The, 44, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4850.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Aeroplane Manufacturers—
Aircraft Manufacturing Co., Ltd., Hendon. "Airmanship, Hyde, London." Kingsbury 180.
Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne." Gosforth 500.
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.
British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol." Bristol 3960.
British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudroplan, Crickle, London." Hampstead 5551.
Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6. Hampstead 4403 and 4404.
Davidson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1344-1145
Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1476
Grahame-White Aviation Co., Ltd., Hendon Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 120.
Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophil, Crickle, London." Hampstead 7420.
Mann, Egerton & Co., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
Martinsyde, Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge." Woking 331; Byfleet 171.
National Aircraft Co., Ltd., 15, Hackney Road, N.E.2. London Wall 6725.
"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London." Willesden 2455.
Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48.
The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis, London." Putney 2230-2241.
Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester." City 8830-8531, Manchester.
Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes." Cowes 193.
Short Bros., Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London"
Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston." Kingston 744.
Standard Aircraft Manufacturing Co., Effingham House, Arundel Street, W.C.2. "Gunsignrush, Estrand, London." City 86.
Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickerlyta, Knights London." Kensington 6810.
Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129
White J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes." Cowes 3

Airships—
Wimbledon 1314.
Airships, Ltd., High Street, Merton
Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, 'Phone, London." Regent 778.

Aluminium Castings (Sand & Die)
Coan, R. W., 210, Goswell Road, London, E.C.1 "Krankases, Isling, London." City 7836.

Bearings (Etonia Cast Phosphor Bronze)—
Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3057.

Brass Sheets for Tipping Propellers—
Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Vic 7026.

Buildings—
Avenue 695, 696, and 5706.
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.
Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313
Rubery Owen & Co., Darlaston, South Staffs.
The Willow Co., Ltd., Salisbury House, London Wall, E.C.2. "Wraithless, Phone, London." City 2681-2

Cable Coverings and Cable Controls—
Herbert Terry & Sons, Ltd., "Springs, Redditch." Redditch 61.

Capstan Work—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Carburettors—
Hobson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1. Victoria 4650

Casein—
Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3. "Suriedon, Fen London." Avenue 34 & 35.

Castings—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Castings (Aluminium, Brass, Bronze, Machined or, Rough)—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Celluloid (Non-Flam.)—
Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7.
London Label Co., Beckton Road, E.16. "Lonlabel, Canning, London." East 1300.

Clothing—
Burberry's, Ltd., Haymarket, S.W.1. Regent 2165.
Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6.
Hazel & Co., 4, Princes Street, Hanover Square, W.1. Mayfair 3071-2.
Robinson & Cleaver, Ltd., Regent Street, London, W.1. Gerrard 1070.

Component Parts—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (4 lines).
B. D. V. Aircraft Spares, Syon Chambers, 162a, Kew Road, Richmond, Surrey. "Aeros, Richmond." Richmond 1681.
Central Aircraft Co., Palmerston Works, High Rd., Kilburn, N.W.6. Hampstead 4728.
Evans, Joseph, & Co., Ltd., Liverpool Street Mills, Birmingham. "Adept, Birmingham." Central 733 (3 lines).
The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aercracons, Canning, London." East 1300.
The Osborne Aircraft Co., Ltd., Whin Hill, Greenock, Scotland. "Cordage, Greenock." Greenock 618.

Cords, Tapes, and Threads—
MacLennan, J., & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3715.

Dopes—
British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London."
British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellulate, London." Regent 4046.
Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawb, London." London Wall 5359-3622.
Clark, Robert, Ingham & Co., Ltd., Caxton House, S.W.1. "Pearline, Vic, London."
Hop 718, 719, and 3758

Electrical Accessories—
Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 1564.
Mann, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston road, London." Museum 70.
Premier Electric Heaters, Ltd., 258, 259, and 260, Bradford Street, Birmingham. "Fahrenheit, Birmingham." Midland 981.

Electric Cables—
E. Kolker & Co., Coventry. "Kolker, Coventry." Coventry 248.
Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 1564.

Electric Lighting and Power—
E. Stanley Fenton, A.M.I.E.E., 67, Mosley Street, Manchester. Central 1268.
Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 1564.

Engines and Parts—
Allon, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford. "Pump, Bedford." Bedford No. 1.
Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.
The Beatty School of Flying, Ltd., The Broadway, Cricklewood, N.W.2. Hampstead 3000.
Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London." Gerrard 2258.
Dutfield-ige Iron Works, Ltd. (Salisbury), 87, Victoria Street, London S.W.1. "Aeroflight, Vic, London." Vic 7026.
Evans, Joseph, & Co., Ltd., Liverpool Street Mills, Birmingham. "Adept, Birmingham." Central 733 (3 lines).
Gordon Watney & Co., Ltd., Weybridge. "Mercedes, Weybridge." Weybridge 550 (7 lines).
Green Engine Co., Ltd., Twickenham. Richmond 1203
Gwynnes, Ltd., Hammersmith Iron Works, Hammersmith, W. "Gwynne, Hammersmith." Hammersmith 1070.
Napier & Son, D., Ltd., 14, New Burlington St., London, W., and at Acton, W. "Niwifiect, London." Gerrard 8026.
Robertson, J. H., & Co., 1, Albemarle Street, London, W.1. Regent 3060.
Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1. "Rollhead, London." Gerrard 1654-5-6.
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.

Engines and Parts (continued)—
Sturtevant, B. F., Co., Ltd., Hyde Park, Boston, U.S.A.
Sunbeam Motor Car Co., Ltd., Wolverhampton. "Moorfield, Wolverhampton."
The Gnôme & Le Rhône Engine Co., Ltd., 47, Victoria Street, S.W. "Elecgno, London." Wolverhampton 498 (2 lines). Walthamstow 408 (2 lines).

Flare Lights—
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Flexible Shafts—
Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Flying Schools—
Bournemouth Aviation Co., Ltd., Talbot Village, Bournemouth. "Etches, Winton." Bournemouth 1180.

Furniture (Office)—
Cooke's (Finsbury), Ltd., Finsbury Pavement House, London, E.C.2. London Wall 573 and 6[illegible].

Galvanising—
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.
The Rustless Iron (Cowper Coles Process) Co., 4, French St., Sunbury-on-Thames, Middlesex. Sunbury 52.

Gears—
Moss Gear Co., Ltd., Thomas Street, Aston, Birmingham. "Mosgear, Birmingham." Central 97[illegible].

Glue—
Central Chemicals, Ltd., 283, West End Lane, London, N.W.6. "Entramical, Westhamp, London."
Improved Liquid Glues Co., Ltd., Gt. Hermitage Street, E. (Croid.). "Excroiden, Wapp, London." Avenue 3[illegible].
Mendine Co., 8, Arthur Street, E.C. Bank 5[illegible].
Oldroyd, Wm., & Sons, Ltd., 9, Mincing Lane, E.C.3. Greenock 618.

Goggles—
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Heating and Ventilating—
Chas. P. Kinnell & Co., Ltd., 65 & 65a, Southwark Street, London, S.E.1. "Kinnell, London." Hop 372 (2 lines).

Hollow Spars—
McGruer Brentwood Hollow Spar Co., Commercial Wharf, Lanneth, S.E. "Gabriel-son, Watloo, London." Hop 718, 719, and 3758

Instruments—
British Wright Co., Ltd., 33, Chancery Lane, W.C.2. Holborn 1308.

Instruments (Scientific, Altimeters, etc.)—
The Cambridge Scientific Instrument Co., Ltd., Cambridge. "Instrument, Cambridge." Cambridge 640.
Short & Mason, Ltd., Macdonald Road, Walthamstow, E.17. "Aneroid, Parkhurst, London." Walthamstow 180.

Machine Tools—
Brewster & Co., 11, Queen Victoria Street, E.C.4. "Circumfuse, Cannon, London." City 768

Magneto Driving Pieces—
Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Magnetos—
The "M-L" Magneto Syndicate, Ltd., Victoria Works, Coventry. "Carlton, Coventry." Coventry 1058.
The British Lighting & Ignition Co., Ltd., 201, Tottenham Court Road, W.1. "Wickmac Phone, London." Museum 430.

Metal Manufacturers—
Clifford, Chas., & Sons, Ltd., Birmingham. "Clifford, Birmingham." Central 1241.
Evans, Joseph, & Co., Ltd., Liverpool Street Mills, Birmingham. "Adept, Birmingham." Central 733 (3 lines).

Metals in General—
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3 Avenue 1432
Samuel Mercer & Co., 198, Upper Thames Street, E.C.4. "Reconciled Cannon, London." City 6[illegible].
Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 695, 696, and 5706

Metal Parts and Fittings—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
Aircraft Supplies Co., Ltd., Ascot House, 125, Long Acre, W.C.2. "Upcast, Rand, London." Gerrard 276 (2 lines).
Arnott & Harrison, Ltd., Hythe Road, Willesden Junction. Willesden 2207.
Bayliss, Jones & Bayliss, Ltd., Wolverhampton. "Bayliss, Wolverhampton" (Bolts and Nuts) Wolverhampton 1041.
The Birmingham Guild, Ltd., 45, Gt. Charles Street, Birmingham. "Handicraft." Central 1795.
Blackburn Aeroplane & Motor Co., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

Metal Parts and Fittings (contd.)—
The British Gold Shell Ring Co., Ltd., Inverness Road, Hounslow, London. "Golshel, Hounslow." Hounslow 254.
British Metal (Kingston), Ltd., Kingston-on-Thames.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.
Mann, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston road, London." Museum 70.
Mountford, Fredk., Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." Kings Norton 261
Robertson, J. H., & Co., 1, Albemarle Street, London, W.1. Regent 3960.
Rubery Owen & Co., Ltd., Darlaston. "Roofs, Darlaston." Darlaston 87.
Sankey, Joseph, & Sons, Ltd., Wellington, Shropshire. "Sankey, Wellington, Salop." Wellington 60.
The Selsdon Aero & Engineering Co., Ltd., Imperial House, Kingsway, W.C.2. Regent 1181.
The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aercracons, Canning, London." East 1300.
Thomas Bros., Ltd., Bradley, Bilston. "Thompson Bros., Bilston." Bilston 10.
Wooler Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10.

Metal Shearing Tools—
Montgomery, Smith, & Co., Ltd., Tangent Works, Keynsham, near Bristol. "Incgenuity, Salford." Keynsham 21.

Metal Spinnings—
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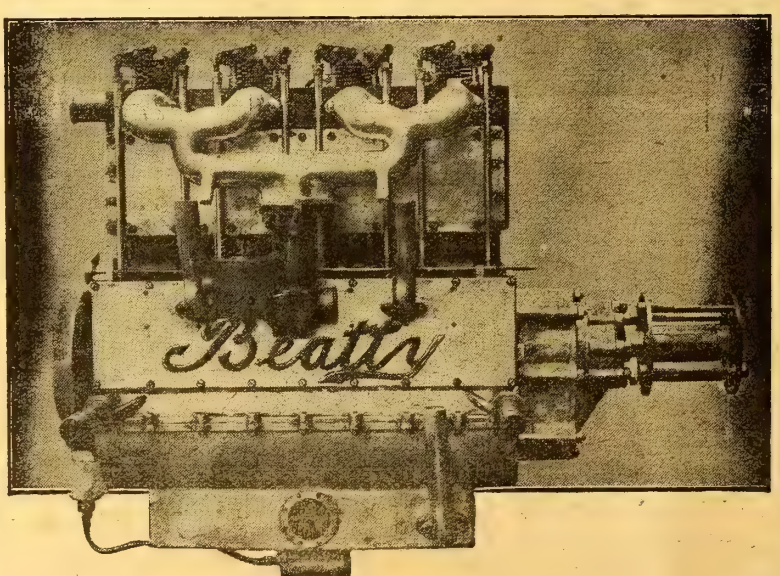
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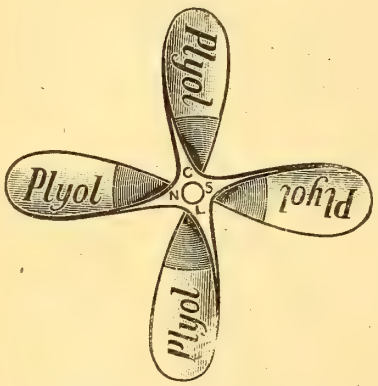
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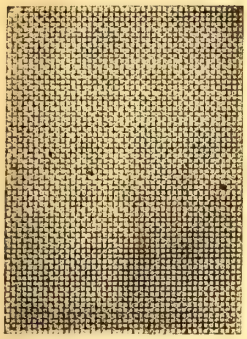
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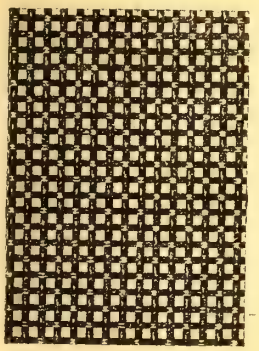
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The water capacity of each cylinder jacket = 7,873 c.c., and the total amount of water carried in the engine without radiators = 30.9 lbs.

Two rectangular honeycomb radiators are fitted, one on each side of the machine.

THE PETROL PUMP.

The automatic petrol pumps, which have recently been fitted, constitute one of the most interesting features of the 230-h.p. Benz engines. Its function, of course, is to supply petrol under pressure to the carburettor without the disadvantages of using petrol tanks under pressure. The pump is used in conjunction with a supplementary pressure reservoir inside the main petrol tank, as shown in the diagrammatic sketch (Fig. 30). The system includes an auxiliary petrol tank and semi-rotary hand pump.

Constructional details of the device are shown in the general arrangement of the pump (Fig. 31), and the functions and operation of the pump and the supplementary pressure reservoir are explained in the diagram.

The petrol pump consists of a small piston of cast-iron, 40 mm. diameter, working in a cylinder or sleeve of phosphor bronze, open at both ends. The piston is arranged below the crank, and the lower portion of its cylinder extends nearly to the bottom of a chamber which contains a determined quantity of castor oil. The piston is operated by a small connecting rod which is driven through worm gears by a spindle forming an extension of the inlet camshaft.

Referring to the drawing of the pump and the diagram, the working principle of the device is as follows :—

Petrol in the main tank enters the petrol pump through the filter at the side of the pump and, on the upward stroke of the piston with the corresponding falling of the castor oil, the petrol is drawn into the annular chamber through the inlet or lower check valve. Upon the downward stroke of the piston, the petrol charge, above the castor oil seal, closes the inlet check valve and forces the charge out of the upper valve. The volume of petrol discharged at every stroke corresponds, of course, to the displacement of the oil by the stroke of the piston.

From the delivery of the pump, petrol is forced through a pipe into the top of the pressure reservoir inside the main petrol tank, and rising in the reservoir, creates a cushion of compressed air above the petrol in the reservoir, thus serving to damp out the pulsations conveyed to the petrol by the action of the pump. From the bottom of the pressure reservoir the petrol is forced upwards through the shorter of the two pipes inside the reservoir, and is delivered under an even pressure to the carburettors.

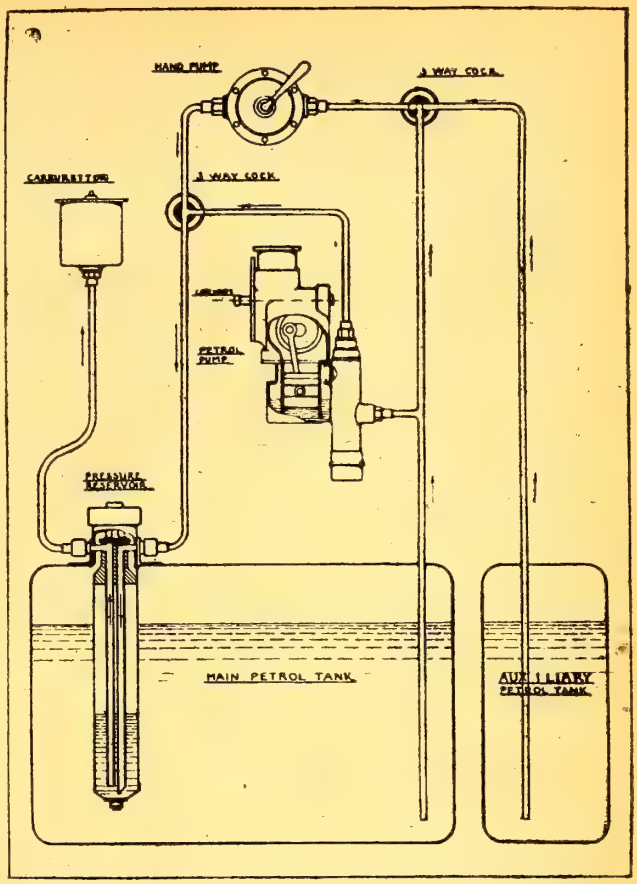


Fig. 30.—Diagram of Petrol System used with Petrol Pump.

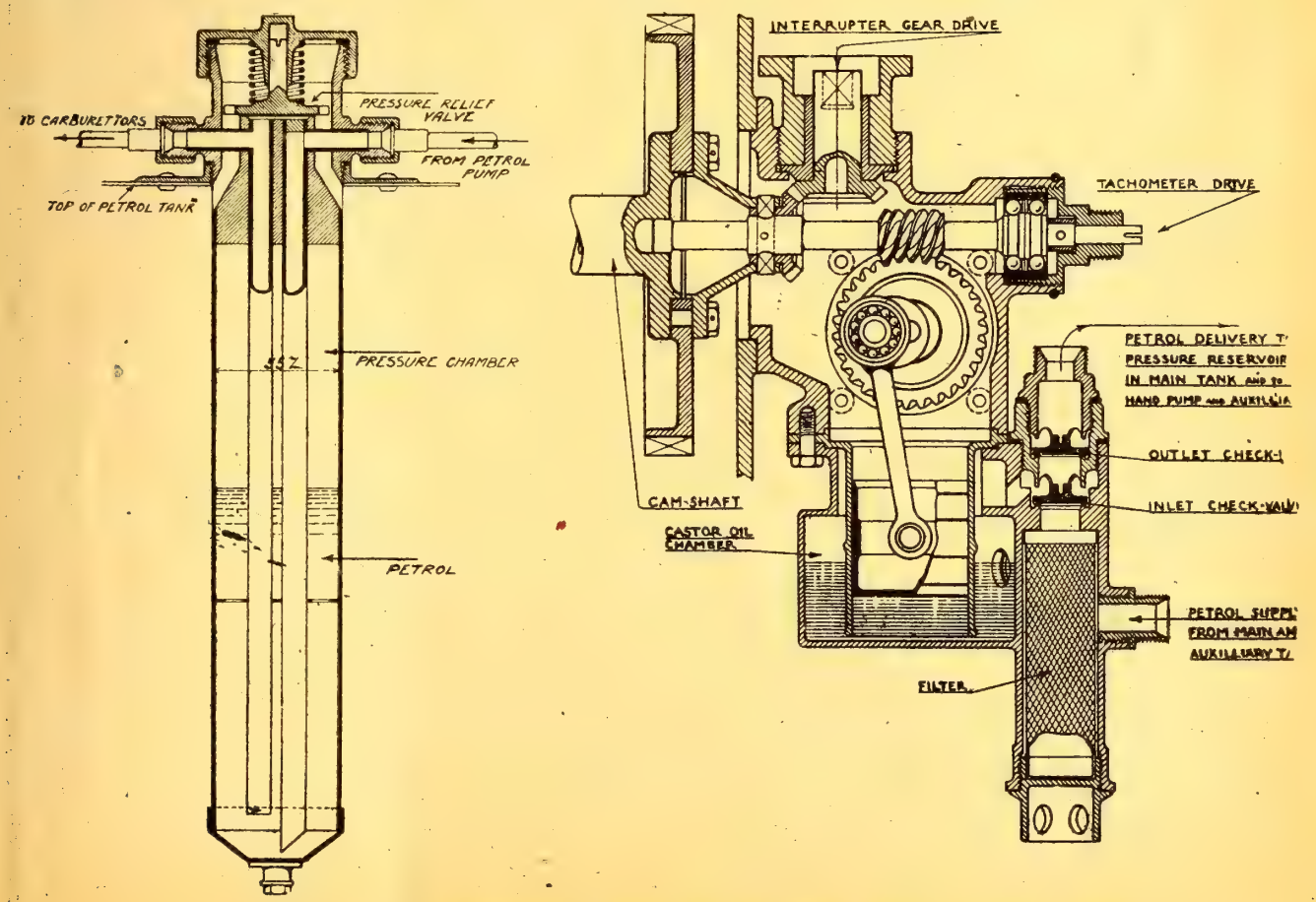


Fig. 31.—Arrangement of Petrol Pump and Section through Pr essure-Reservoir.

A relief pressure valve is fitted to allow excess petrol to return to the main petrol tank through twelve holes drilled in the head casting of the pressure reservoir.

As illustrated in the diagrammatic drawing of the petrol system a supplementary petrol system is used, employing an auxiliary petrol tank and a semi-rotary hand pump in conjunction with the main system.

Two three-way cocks are fitted, as shown, which allow any one of the following three systems to be used, viz. :—

(a) Main petrol pump from main tank.
(b) From main tank by hand pump.
(c) By hand pump from auxiliary tank.

The driving spindle of the petrol pump also drives a vertical spindle through small bevel gearing which operates the interrupter gear for the machine-guns. To the rear end of the pump spindle is fitted the flexible tachometer drive.

In the earlier types of petrol pumps fitted to the Benz engines the castor-oil chamber was provided with an oil-filling cup. This was screwed into the side of the chamber casting and was fitted with a special form of drain cock to determine the quantity of oil poured into the pump. This filling arrangement has now been given up and the annular oil chamber fitted with a drain plug only. The speed ratio of the driving spindle to the small crankshaft driving the piston of the petrol pump = 10.75 to 1.

The bore of the pump = 40 mm. and stroke = 26 mm. Lift of valves (inlet and outlet) = 2 mm. Volume of petrol delivered at each stroke of pump = approximately 2 cub. ins.

The weight of the complete petrol pump = 6.75 lbs.

Test results of this petrol pump carried out recently at the Royal Aircraft Factory are given in the following report :—

EFFECT OF ANGLE.—The normal consumption of this engine is approximately 150 pints per hour at normal speed, and the pump has a greater delivery than this at any angle up to 60° in any direction.

DELIVERY.—Maximum : 288 pints per hour at 10 lbs. per square inch pressure when the pump was vertical and running at 850 r.p.m. At normal speed, i.e., 700 r.p.m., the delivery is 233 pints per hour. At speeds in excess of 750 r.p.m. the inertia of the fluid columns causes displacement of the castor oil.

RUNNING WITHOUT CASTOR OIL.—The pump was run for 10 minutes with the piston in direct contact with the petrol, with no deleterious effect.

A number of tests have been carried out to determine the rate of flow, also the inlet and outlet pressures of the pump, while tilted at the angles which are likely to occur when the machine is in flight while banking to the right and left, diving and climbing. Readings obtained as a result of the tests are tabulated on following page.

The accompanying graphs (Figs. 33 and 34) show :—

(i) The delivery of the pump over a certain range of speeds, the angles denoting the positions at which the pump **was set.**

(ii) The delivery at constant revolutions while working at angles of + or - 60°

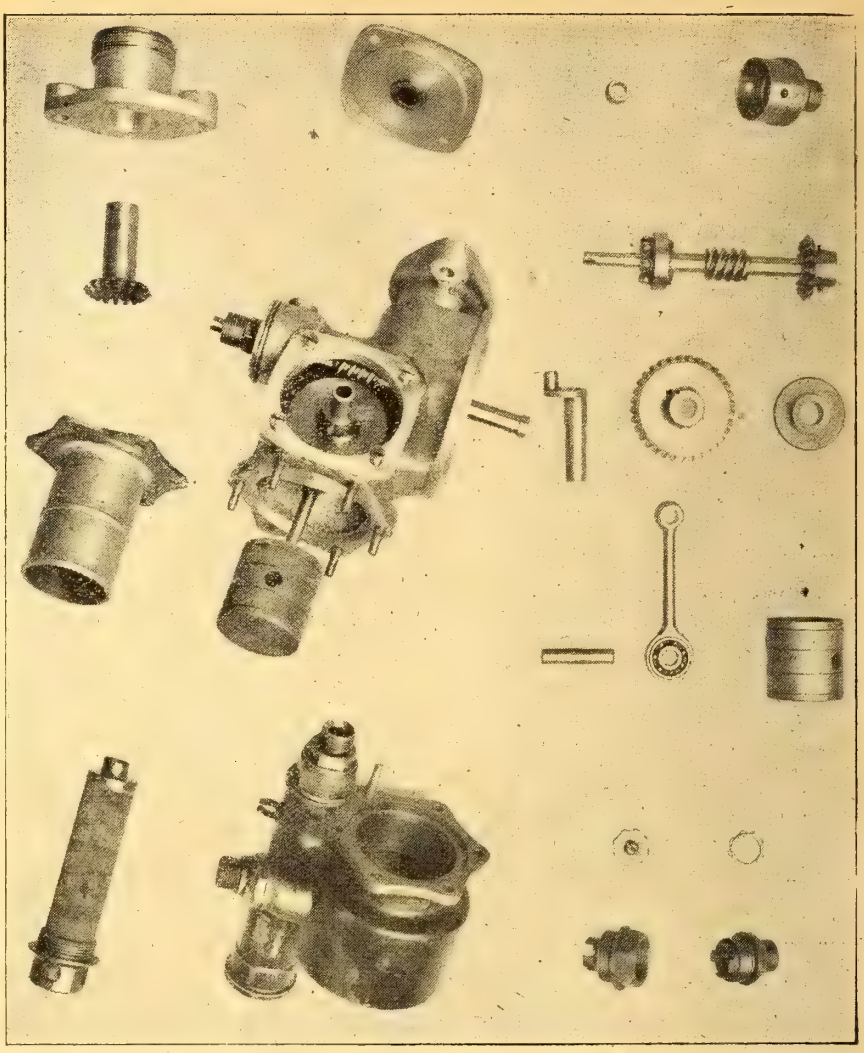


Fig. 32.—The Parts of the Petrol Pump Dissembled.

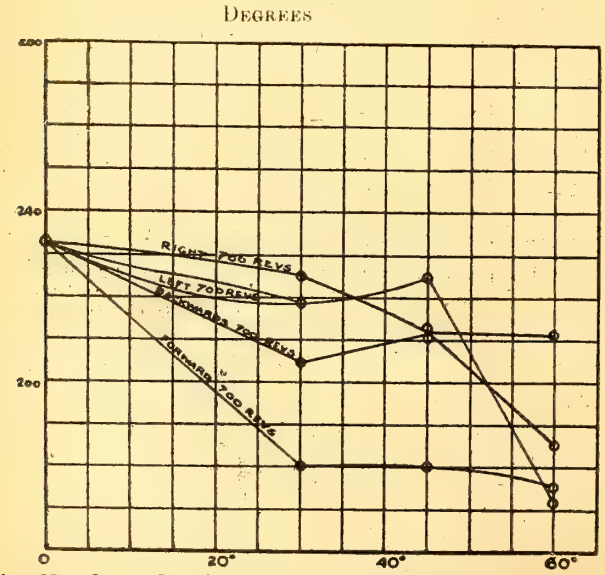


Fig. 33.—Curve Showing Delivery of Petrol Pump at Various Angles.

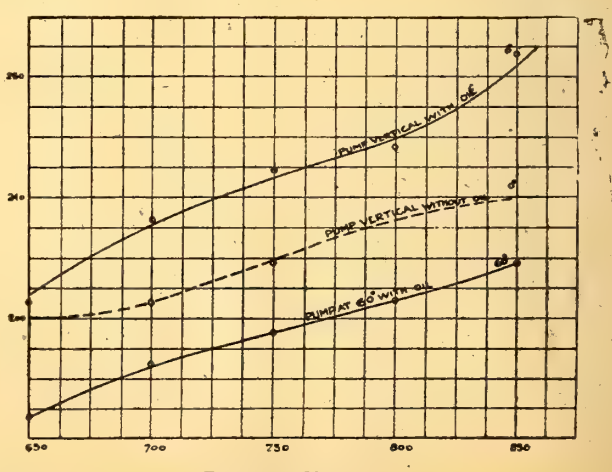


Fig. 34.—Curve Showing Delivery of Petrol Pump, with and without Oil.

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The maximum delivery obtained from the pump was 288 pints per hour. This was obtained at a pressure of 10 lbs. per square inch when the pump was vertical and running at 850 r.p.m. In no case does the delivery fall below 160 pints per hour. A test was also carried out on the pump without castor oil; under these conditions the pump was run successfully for about 10 minutes after which the test was stopped.

TEST OF PETROL PUMP AT VARIOUS ANGLES.

Speed.	Vertical, with Oil. Vacuum Mercury. ins.	Pressure. lbs.	Pints Per hour	Vertical, No Oil. Vacuum Mercury. ins.	Pressure. lbs.	Pints Per hour.
650	1.5	2	205.7	3	2	200
700	2	6	232.2	3.25	6	205.7
750	2.5	8	248.2	3.25	6.5	218.2
800	2.75	9	257	3.5	7	232.2
850	3	10	288	4	7.5	240
	30° Right.			30° Left.		
650	1.5	2	205.7	1.5	2	205.7
700	2	5	226	2	5	218.2
750	2.5	6	240	2.5	6	232.2
800	2.75	7.5	248.2	2.75	8	240
850	3	9	257	3	9	248.2
	45° Right			45° Left.		
650	2	2	205.7	2	2	205.7
700	2.5	5	211.7	3	5	225
750	3	7	232.2	3.5	7	218
800	3.25	8	240	3.5	8	240
850	3.25	9	248.2	3.5	9	232.2
	60° Right.			60° Left.		
650	2	2	200	2	1.5	160
700	2.75	5	211.7	2	2	171.4
750	3	7	232.2	2	2	171.4
800	3.25	8	240	2	2	171.4
850	3.5	9	248.2	2.5	2.5	184.6
	30° Forward.			30° Backwards.		
650	2	1.5	160	2	2	200
700	2.25	4	180	2.25	5	205.7
750	2.5	5	184.6	2.5	6	218.2
800	3	6	200	2.75	6.5	225
850	3	7	205.7	3	7	232.2
	45° Forward.			45° Backwards.		
650	1.75	1.5	167.4	2	2	200
700	2	4	180	2.25	5	211.7
750	2.25	5	184.6	2.25	6	218.2
800	2.5	6	194.6	2.75	6.25	211.2
850	2.75	7	205.7	3	6.75	225
	60° Forward.			60° Backwards.		
650	1.75	1.5	163.6	2	2	167.4
700	2	4	175	2.5	4	184.6
750	2.25	5	184.6	2.75	6	194.6
800	2.5	6	189.4	2.75	6.5	205.7
850	2.75	6.5	200	3	7	218.2

September 4th, 1917.

ROYAL AIRCRAFT FACTORY TEST REPORT ON 230-H.P. BENZ ENGINE.

Power throttle and consumption curves are shown in Fig. 36.

The engine was run up to 1700 r.p.m., the peak of the power curve occurring at 1650 r.p.m., at which 250 h.p. was developed.

The maximum brake m.e.p. reached 119 lbs. per square inch at 1100 r.p.m.

The results of a one-hour test run were as follows:—

R.P.M.	1400
B.H.P.	229
Petrol Consumption	150 pints.
Oil Consumption	4.5 pints.
Water Inlet Temperature (average)	62°C.
Water Outlet Temperature (average)	71°C.
Oil Temperature (Max)	50°C steady.
Oil Pressure (Min.)	28 lbs. sq. in. steady.

The curve (Fig. 35) shows inlet and exhaust valve lifts at various angles of rotation.

The engine was erected on a test bed and coupled to a Heenan and Froude Water Dynamometer.

After preliminary running, during which the Exhaust Manifold broke and was replaced by one from a similar engine, the attached power, throttle, and consumption curves (Fig 36) were obtained.

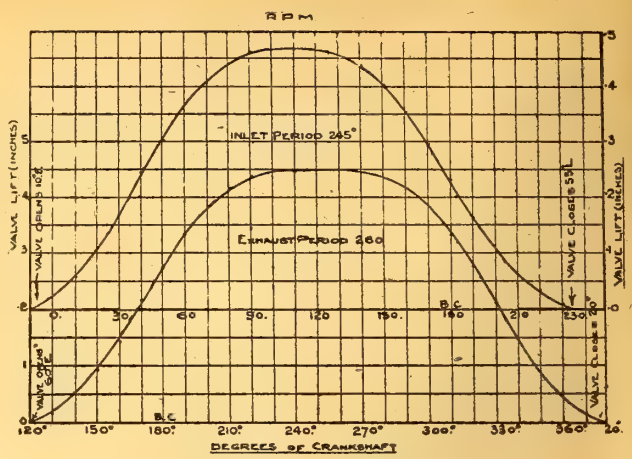


Fig. 35.—Valve Lift Diagram.

230-h.p. BENZ ENGINE DATA.

Number and arrangement of cylinders	6 vertical
Bore	145 mm. (5.71 ins.).
Stroke	190 mm. (7.48 ins.).
Stroke/bore ratio	1.31-1
Stroke volume of one cylinder	3137.476 cub. cms. (191.386 cub. ins.).
Total stroke volume of engine	18824.856 cub. cms. 1148.316 cub. ins.).
Area of one piston	165.13 sq cms. (25.59 sq. ins.).
Total piston area of engine	990.78 sq. cms. (153.57 sq. ins.).
Clearance volume of one cylinder	796 cub. cms. (48.66 cub. ins.
Compression ratio	4.91-1.
Normal B.H.P. and speed	230 B.H.P. at 1,400 r.p.m.
Piston speed	1,744 ft. per min.
Brake mean effective pressure	113 lbs. per sq. inch at 1,400 r.p.m.; 119 lbs. per sq. inch at 1,100 r.p.m.
Cub. inches of stroke volume per B.H.P.	4.99.
Sq. inches of piston area per B.H.P.	.667.
H.P. per cub. ft. of stroke volume	346.3 h.p.
H.P. per sq. ft. of piston area	215.9 h.p.
Direction of rotation of crank	R.H.T.
Direction of rotation of propeller	R.H.T.
Normal speed of propeller	Engine speed.

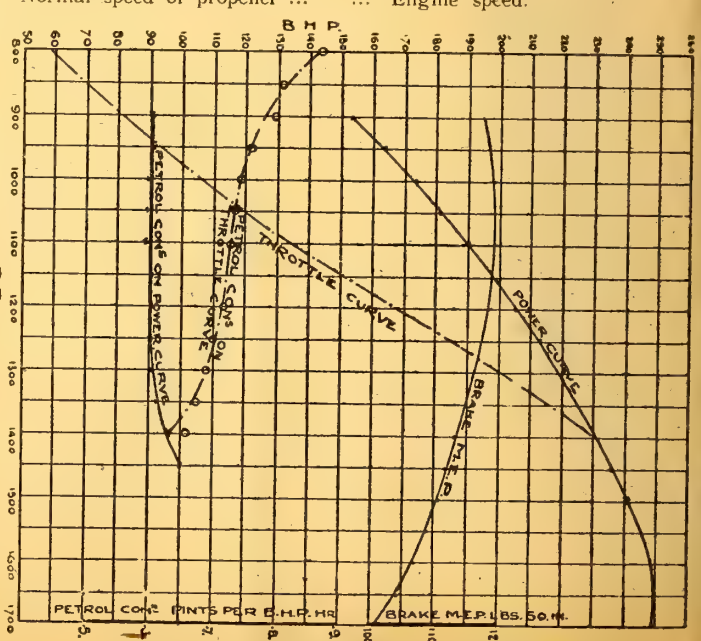


Fig. 36.—Power, Throttle, and Consumption Curves.

AIRCRAFT MANUFACTURING COMPANY——LIMITED

Contractors to

War Office and Admiralty

London Office

27, BUCKINGHAM GATE, S.W.1

Offices & Works

HENDON, N.W.9.

Lubrication system	Forced to main bearings from reservoir in sump.
Brand of oil	50 per cent. Vacuum Heavy and 50 per cent. Sternol.
Oil pressure	28 lbs. normal, 50 lbs. max.
Oil temperature	50° C., max.
Oil consumption per hour	4.5 pints.
Oil consumption per B.H.P. hour...	.02 pints.
Specific gravity of oil	.9
Type of carburettor	2 Benz each feeding 3 cylinders (2 jet).
Mixture control	Automatic.
Fuel consumption per hour... ...	150 pints.
Fuel consumption per B.H.P. hour	.65 pints.
Specific gravity of fuel	.720
Type of magneto	2 Bosch Z.H.6.
Firing sequence of engine	Prop: 1-5-3-6-2-4
Numbering of cylinders	Prop: 1-2-3-4-5-6.
Speed of magneto	2/3rds engine speed
Direction of rotation of magneto, facing driving end of armature...	Anti-clockwise.
Magneto timing	30° E. 18 mm. on stroke.
Inlet valve opens. Deg. on crank	10° E.
Inlet valve closes. Deg on crank	55° L.
Maximum lift of inlet valve = h...	11.8 mm. (.465 in.).
Diameter of inlet valve = d (smallest diam.)	Two of 52 mm.
Area of inlet valve port = $\pi \times d \times h$	19.27 sq. cms. each.
Mean gas velocity through inlet valve	124 ft. per sec.
Clearance of inlet tappet	.009 in.
Exhaust valve opens. Deg. on crank	60° E.
Exhaust valve closes. Deg. on crank	20° L.
Maximum lift of exhaust valve = h	11.25 mm. (.443 in.).
Diameter of exhaust valve ports = d (smallest diam.)	Two of 52 mm. dia.
Area of exhaust valve ports = $\pi \times d \times h$	18.37 sq. cms. (each) = 2.84 sq. ins.
Clearance of exhaust tappet ...	.015 in.
Direction of rotation of revolution counter drive, facing driving shaft on engine	Anti-clockwise.
Speed of revolution counter drive...	½ E.S.
Weight of engine complete with propeller hub, less water, fuel and oil and exhaust manifold	848.32 lbs.
Weight per B.H.P. ditto	3.68 lbs.
Weight of exhaust manifold	15 lbs.
Weight of oil carried in engine ...	18 lbs.
Jacket capacity of one cylinder ...	1873 c.c.
Weight of water carried in engine ...	30.9 lbs.
Weight of radiators, less water ...	136 lbs.
Weight of fuel per hour	135 lbs.
Weight of oil per hour	5.06 lbs.
Total weight of fuel and oil per hour...	140.06 lbs.
Gross weight of engine in running order, less fuel and oil. Cooling system at 0.65 lbs. per B.H.P. ...	996 lbs.
Weight per B.H.P. ditto	4.33 lbs.
Gross weight of engine in running order with fuel and oil for six hours. (Tankage reckoned at 10 per cent. weight of fuel and oil)	1920.89 lbs.
Weight per B.H.P. with fuel and oil for six hours.	8.35 lbs.

WEIGHTS OF PARTS.

LISTS OF COMPARATIVE WEIGHTS OF PARTS AND THEIR PERCENTAGE OF TOTAL WEIGHT OF ENGINE.

Description of Part.	Lbs.	Per cent. Total Weight.
Cylinders, complete, including supports for rocker levers (six at 44.25	265 5	30.753
Pistons, complete, with rings and gudgeon pins (six at 7.62 lbs. each) lbs. each)	45.72	5.296
Connecting rods, complete (six at 7.13 lbs. each)	42.78	4.955
Valves and springs complete (twenty-four at 1.14 lbs. each)	27.36	3.169
Tappets, push rods and rocker levers (twelve sets at 3.2 lbs. each)... ...	38.4	4.447
Induction pipes, complete (two at 2.625 lbs. each)	5.25	.608
Carburettors, complete (two at 6.54 lbs. each)	13.08	1.515
Crank-chamber, top half	103.25	11.959
Crank-chamber, bottom half (including cylinder studs and oil pump shaft)	110.25	12.77
Crankshaft, complete	109.25	12..66
Propeller boss, complete	19.32	2.236
Camshafts, complete, with bearings less gear-wheels (two at 8.25 lbs. each)	16.5	1.912
Magnetos, complete (two at 10.75 lbs. each)	21.5	2.490
Ignition wiring, complete (two at 2.12 lbs. each)	4.24	491
Water pump, complete	8.75	1.013
Oil pump, complete	2.89	.335
Petrol pump, complete	6.75	.782
Exhaust manifold	15	1.737
Miscellaneous parts	7.53	.872
Total weight of complete engine	863.32	100

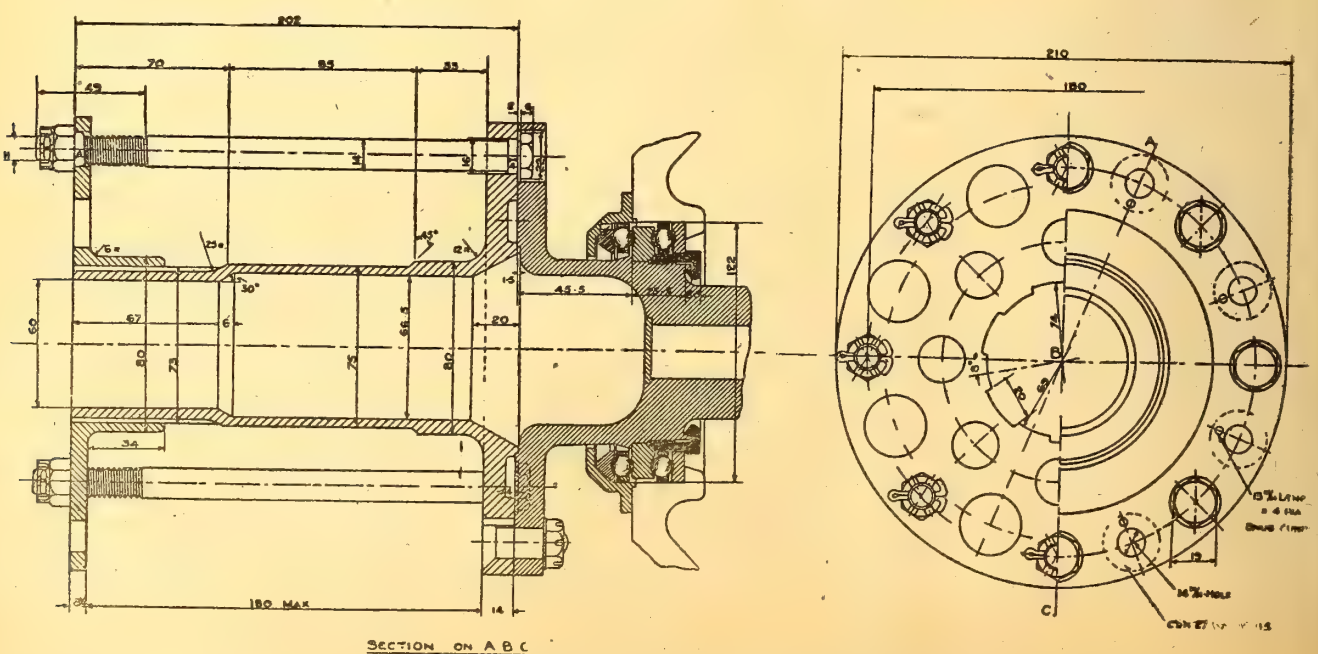
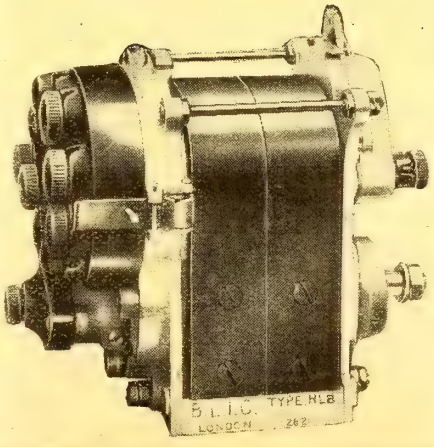


Fig. 37.—Arrangement of Airscrew Boss and Thrust Race.

THE HEART OF THE AEROPLANE—the vital centre of its power unit—is undoubtedly the magneto. Failure there must be unthinkable! That is why the "B.L.I.C." Magneto is supreme—its absolute reliability may be taken for granted!

B·L·I·C

THE BRITISH LIGHTING & IGNITION Co Ltd



THE BRITISH LIGHTING & IGNITION Co., Ltd.

204, Tottenham Court Road, London, W 1
Proprietors: VICKERS, Ltd.

CHEMICAL ANALYSES.

Chemical analyses have been made on parts of the Benz engine with the following results :—

	Carbon Per cent.	Silicon Per cent.	Sulphur Per cent.	Phosphorus Per cent.	Manganese Per cent.	Nickel Per cent.	Chromium Per cent.
Water jacket	0.07	0.03	0.046	0.0027	0.35	Nil	0.02
Crankshaft	0.13	0.31	0.026	0.0014	0.48	3.21	0.87
Connecting rod ...	0.15	0.21	0.027	0.0026	0.37	4.02	1.21
Gear wheel	0.23	0.25	0.014	0.0027	0.53	3.58	0.81
Camshaft	0.14	0.23	0.029	0.0026	0.95	4.68	1.48
Inlet valve	0.26	0.28	0.012	0.0020	0.40	5.36	1.06
Valve spring	0.40	0.02	0.033	0.0085	0.55	Nil	0.01

	Graphitic Carbon Per cent.	Combined Carbon Per cent.	Silicon Per cent.	Sulphur Per. cent	Phosphorus Per cent.	Manganese Per cent.
Cylinder	1.90	0.77	1.68	0.122	0.176	0.48
Piston	1.85	0.50	1.46	0.130	0.210	0.77

	Graphitic Silicon Per ent.	Combined Silicon Per cent.	er Iron ent.	ec Tin	Copper Per cent.	Zinc Per cent.	Lead Per cent.	Aluminium Per cent.
Crankcase ...	0.18	0.89	0.93	Trace	6.20	9.59	Trace	82.21

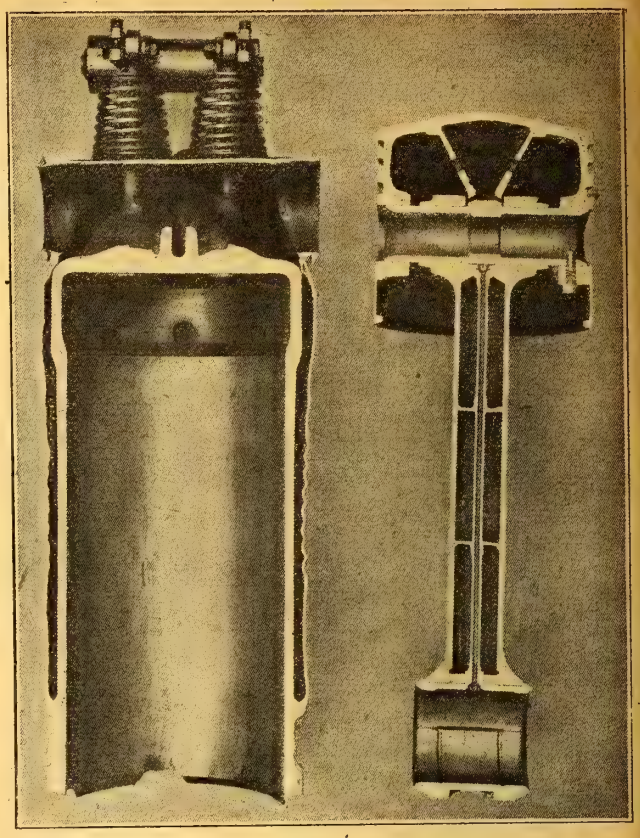
	Antimony. Per cent.	Tin. Per cent	Copper. Per cent.	Lead Per cent
Bearing metal	11.95	78.57	8.10	0.90

The analyses of gear wheel and camshaft were made on drillings taken from the cores, as these were case-hardened parts.

MECHANICAL TESTS.

Mechanical tests gave results as under :—

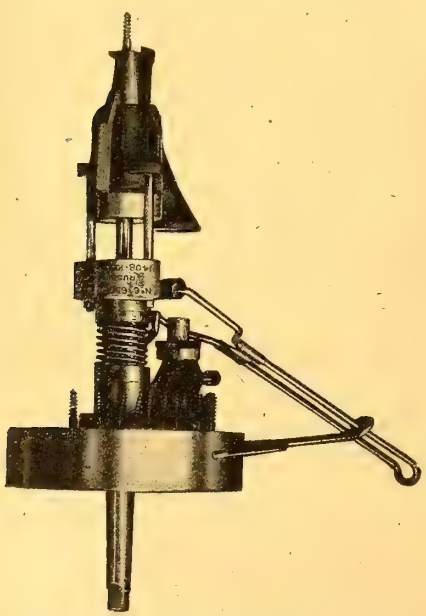
	Yield Point. Tons per square in.	Ultimate Stress. Tons per Square in.	Elongation. Per cent.	Reduction of Area. Per cent.	Impact. Ft./lbs.
Crankshaft	55.2	62.5	21.3	59.75	26
Cylinder	—	8.36	Nil	Nil	—
Connecting rod	41.9	48.1	14.0	—	—
Crankcase	—	8.91	—	—	—



A sectional view of a cylinder and a piston and connecting rod of the 230-h.p. Benz engine. Note the shape of the combustion head and valve pockets and the arrangement of the water-jacket. The oilway from the crank-pin bearing to the gudgeon-pin bearing is clearly seen. The central cone of the piston, which carries the power direct to the centre of the small end bearing, is noteworthy.

A LABOUR-SAVING TOOL.

The Russell Patent Automatic Screw-driver is a new and ingenious tool, which is proving to be extremely useful on repetition work in almost all industries in which large numbers of screws have to be driven into horizontal surfaces. It is designed to be used in connection with any ordinary vertical drilling or boring machine, to which it may be instantly attached simply by means of its standard taper-shank, in the same way as a Morse drill.



The Russel Automatic Screw-driving Machine.

All parts of the screw-driver are mounted upon, and actuated by, the one central spindle, so that the attachment is entirely self-contained.

A number of screws are just thrown into the hopper: they are automatically separated and supplied singly to the delivery nozzle as required.

The particular screw to be driven is quite visible to the operator, and consequently may be easily and accurately located on the work. The operator simply brings down the sensitive feed lever of the drilling machine, and the screw is driven home into the work with great rapidity. As one screw is being driven another screw is automatically fed down to take its place in the delivery nozzle; so that by working the drilling-machine lever up and down the screws are driven, one after another, just as quickly as the operator can bring the work into position.

It is worthy of note that, as the entire screw-driver is raised and lowered with the machine spindle, successive screws may be driven into work at varying heights from the machine table, without re-adjustment.

The heads of the screws driven are not damaged. Screws are not *pushed* into the work; a revolving blade engages the slotted head of the screw and screws it into the work as well as it could possibly be done by hand. When a screw has been driven home, its resistance releases a clutch and so allows the screw-driving blade to remain stationary until it is withdrawn from the head of the screw. The resistance at which the said blade ceases to revolve may be adjusted to meet requirements by an extremely simple torsion adjusting device.

In cases where the work is of sufficient section to avoid splitting, screws may be driven even into very hard wood without previous drilling.

Russell Patent Automatic Screw-drivers are in use for driving metal thread screws as well as wood screws, and have proved themselves to be extremely valuable labour-saving tools in a large range of industries.

Various users report that these machines have effected a saving of from 30 per cent. to 75 per cent. in cost of work, and in some cases machines have saved their own cost in two weeks' working.

Enquiries should be addressed to Russell Bros., Redditch, who will be pleased to send an illustrated leaflet illustrating different models.

THE NEED FOR CRAFTSMEN.

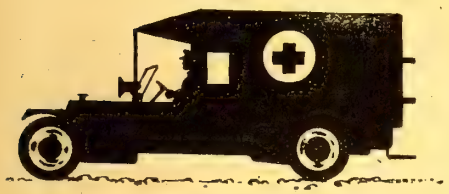
During the hearing of a case before the Russian Tribunal, at Caxton Hall, on Dec. 11th, Sir Edward Smith, who presided, stated that there was a big demand for skilled workers in aircraft factories.

He knew that in one factory, which now employed 2,000 men, it was proposed to increase the number to 5,000 in the next six months.

Triplex Safety Glass



"TRIPLEX" for Aeroplane Goggles, Windshields and Observation Panels.



"TRIPLEX" for Windows and Windscreens of Red Cross Vans, Transports, etc.



"TRIPLEX" for Goggles for Despatch Riders, etc.



"TRIPLEX" for the Portholes of Warships, Merchant Vessels and Passenger Liners.

O.H.M.S.

"TRIPLEX" SAFETY GLASS is doing its bit at home and at the front by saving the sight and even the lives of aviators, motor-transport drivers, etc. This wonderful glass, whilst being outwardly indistinguishable from ordinary glass, is absolutely unsplinterable. It can be cracked, but no particle can become detached.

"TRIPLEX" should be used in *all* cases where glass is required, because it is the *only* safety glass.

AN IDEAL XMAS GIFT

for your Soldier, whether he be an airman, despatch-rider or motor-transport driver, is—

A PAIR OF "TRIPLEX" GOGGLES

Investigate Triplex. Catalogues free on request.

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AND H.M. WAR OFFICE.

Designers and Manufacturers of Proved Efficiency of all Types of AIRCRAFT

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SPECIAL DEPARTMENT
for the manufacture of
AIRCRAFT ACCESSORIES
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AIRCRAFT FINANCE

CURRENT TOPICS.

A NOTE TO COMPANY OFFICIALS.

Annual Returns.

At the end of this month a large number of companies engaged in the Aircraft Industry close their accounts, and should prepare to file their returns with the Registrar of Joint Stock Companies in compliance with the Companies Acts. The forms and particulars have been changed and varied in many respects during the year, more particularly with regard to the return of directors, and the earnest attention of officials, particularly of private companies, is drawn to the necessity for obtaining the new forms and lodging them within the prescribed limit of time.

It is a striking feature in connection with aircraft companies that the larger proportion are private companies—i.e., companies which have not been publicly subscribed, and whose shares are not dealt in on the various Stock Exchanges of the United Kingdom. Such companies are not called upon to file a balance-sheet or a general statement of affairs, but they are compelled to hold a general meeting of shareholders once at least in every calendar year, limited by the Act to a period not exceeding 15 months from the date of holding the last preceding general meeting.

The urgent necessity for complying with these formalities is demonstrated by the heavy penalty for default. Every company, director, manager, secretary, and other official knowingly a party to the default is liable to a fine not exceeding £50, and particular attention is drawn to the fact that this clause of the Act applies to every company both private and public.

A new company shall hold its first meeting (called a statutory meeting) within a period being not less than one month nor more than three months from the date at which the company was entitled to commence business. Thereafter the general rule applies as to annual meetings. Form E should then be lodged with the Registrar, made up to a date being the fourteenth day after the general shareholders' meeting, setting out full particulars regarding the shares issued, the amounts paid up, the number of shares issued as fully paid, together with a list of shareholders, with names and addresses, and a list of directors, with their nationality, occupation, and residence

In the case of a private company, provided a certificate is duly signed declaring that the company has not since the date of the last return (or since the date of the incorporation of the company) issued any invitation to the public to subscribe for shares or debentures of the company, no accounts need be filed.

These formalities would seem to be comparatively simple, but I had reason to inspect the files of certain companies recently, and was astonished to find the apparent neglect shown by company officials in complying with the requirements of the Act under this head.

At the present moment the authorities appreciate the difficulty experienced by so many companies owing to depleted staffs, and the question of allocating reserves to meet Excess Profit Duties and Munition Levies affecting all companies in the Aircraft Industry, and are therefore disposed to grant more than usual latitude in this respect, but I am given to understand that companies in arrear with these formal requirements will receive official attention early in the New Year, and I therefore strongly advise company officials not to delay in putting their records in order.

AN IMPORTANT LEGAL DECISION AFFECTING EXCESS PROFITS DUTY.

An important case has just been decided, which is one of particular interest to the Aeroplane Industry, dealing with an important detail in connection with Excess Profits Duty.

The case in question was a summons to determine whether, in ascertaining the net profits of a business for each year in order to arrive at the amount of commission payable to a managing director under his agreement with the company under which he was paid a commission on "the net profits of the business," Excess Profits Duty ought or ought not to be deducted before the defendant's commission was calculated.

Under the contract of service, which was made in 1914 between the plaintiff company and the defendant, the defendant became managing director of the company for a fixed period at a paid salary plus a commission "on the net profits of the business" of the company. A certain clause of the agreement provided how these net profits were to be arrived at, and directed certain specific deductions to be made and certain specific deductions not to be made.

In 1915 and 1916 the company made large profits, in respect of which Excess Profits Duty became payable under the Finance Acts. The company contended that the Excess Profits Duty was a debt and a necessary outgoing of the company which ought to be deducted from the profits of the company before this commission was calculated.

Justice Neville, after reviewing the facts, ruled that the Excess Profits Duty ought not to be deducted from the profits of the company before the commission of the defendant is ascertained. The decision of the learned judge is a very important one in its bearing on such contracts, and will be of interest to the many private aircraft companies under the control of a manager participating in the profits. G. A.

MORTGAGES AND CHARGES REGISTERED.

Satisfactions.

Brighton-Shoreham Aerodrome, Ltd. (late Aviators Finance, Ltd.), London, E.C.—Satisfactions registered, Dec. 6th, for £6,750, part of £7,500, registered May 12th, 1911; and registered Dec. 7th, £3,000, and certain other moneys, registered Aug. 6th, 1915.

ANSWERS TO CORRESPONDENTS.

Inquiries on any subject affecting or relating to Investments, Stocks, Shares and Securities of Aircraft and kindred companies will be answered in these columns (free of charge).

"F. W. H."—The question you raise is a very old and much-debated one. It is apparently very difficult to attain the happy mean between the information to be disclosed in balance-sheets to shareholders and that which directors should publish, and at the same time guard against competitors acquiring knowledge which they may be in a position to make use of against the company. I think, however, you will find that if you are a

CURRENT SHARE QUOTATIONS.

Aircraft Mnfg. Co.	7% cum. pref. £1 ...	24-	25/-
	7% cum. & ptg. "B" pref., (fully paid) ...	22/-	23/-
Armstrong (Sir W. G.) Whitworth & Co., Ltd.	4% cum. pref. £5...	3⅛	3⅜
	5% 2nd. pref. £1 ...	17/-	18/-
	£1 ordinary	42/-	43/-
Austin Motor Co., Ltd.	7% cum. pref. £1...	18/-	19/-
	£1 ordinary	25/-	26/-
Birmingham Small Arms Co., Ltd.	£1 ordinary	50/-	51/-
	5% cum. "A" pref.	4⅛	4⅜
	6% cum. "B" pref.	19/-	20/-
Boulton & Paul, Ltd., 5% cum. pref. £1		⅜	⅞
Brown Bros., Ltd., 6% cum. pref. £5...		4⅛	4⅜
Darracq (A) & Co., (1905) Ltd.	£1 ordinary ...	22/-	23/- x
	7% cum. pref. £1...	22/-	23/- x
Electric Construction Co., Ltd.	7% cum. pref. £1 ...	20/-	21/- x
	£1 ordinary	24/-	25/-
Fellows Magneto Co., 8% cum. partip. pref.		16/-	17/-
General Electric Co., Ltd.	6% cum. pref. £10 ...	10¼	10¾
	£10 ordinary	19¾	20
Gwynnes, Ltd., 5% cum. pref.		94/-	95/-
Ordinary		14/-	15/-
Greenwood & Batley, Ltd., £10 ordinary		9¾	10
Humber, Ltd., 6% cum. pref. £1		15/6	16/6 x
£1 ordinary		19/-	20/-
Napier (D) & Son, Ltd., 7⅛% cum. pf. £1		18/-	19/-
Peter Hooker, Ltd., £1 7% cum. partic. 1st pref.		20/	21/-
Rolls Royce, Ltd.. £1 ordinary		62/-	63/-
Rudge Whitworth, Ltd. £1 ordinary ...		50/-	51/-
Ruston, Proctor & Co., Ltd.	£1 ordinary	28/-	29/-
	5% cum. pref. £1 ...	17/-	17/6
Sunbeam Motor Car Co., Ltd., £1 ord...		79/-	80/- x
Straker Squire, Ltd. (1913), £1 ordinary		22/-	23/-
S. Smith & Son, Ltd. (Motor Accessories) £1 ordinary		26/-	27/-
Triplex Safety Glass, £1 ordinary... ...		24/-	25/-
Vickers, Ltd., 5% pref. stock...		78	826
5% pref. shares. £1 ...		17/6	18/-
£1 ordinary		42/-	43/-
Wm. Beardmore & Co., Ltd., 6% c. pf. £1		19/-	20/

GENERAL INFORMATION.

Armstrong, Whitworth (1916).
Austin Motor (1916).
B'ham. Small Arms (1915-16).
Rolls Royce.
Rudge Whitworth.
Straker-Squire (1915).
Sunbeam Motor.
Thorneycroft (J. I.) & Co.
Vickers (1915 and 1916).

Owing to the difficulty of estimating liabilities under Finance and Munitions Acts, the accounts will not be ready until a later date.

x—ex dividend

genuine shareholder, and you apply privately to the company for information, it will not be refused.

"SECRETARIAL."—The Companies Acts stipulate a limit of time for issuing certificates for shares. Section 92 (1) provides that every company shall, within two months after the allotment of any of its shares, debentures, or debenture stock, and within two months after the registration of the transfer of any such shares, debentures, or debenture stock, complete and have ready for delivery the certificates of all shares, the debentures, and the certificates of all debenture stock allotted or transferred, unless the conditions of issue of the shares, debentures, or debenture stock otherwise provide; and (2) if default is made in complying with the requirements of this section, the company, and every director, manager, secretary, and other officer of the company who is knowingly a party to the default, shall be liable to a fine not exceeding five pounds for every day during which the default continues. The Act is very clear on the point, and covers private as well as public companies.

"DIFFICULTY."—Notify the secretary of the company of the following, and you will undoubtedly find your difficulty will be overcome. The Companies (Consolidation) Act, 1908, specifically provides; Section 129:—

"That a company may be wound-up by the Court (V) if the company is unable to pay its debts." The Act goes on to define (Section 130): "A company shall be deemed to be unable to pay its debts, (1) if a creditor, by assignment or otherwise, to whom the company is indebted in a sum exceeding fifty pounds then due, has served on the company, by leaving the same at its registered office, a demand under his hand requiring the company to pay the sum so due, and the company has for three weeks thereafter neglected to pay the sum, or to secure or compound for it to the reasonable satisfaction of the creditor; or (2) if, in England or Ireland, execution or other process issued on a judgment decree or order of any Court in favour of a creditor of the company is returned unsatisfied in whole or in part; (3) if, in Scotland, the induciæ of a charge for payment on an extract decree, or an extract registered bond, or an extract registered protest, have expired without payment being made; or (4) if it is proved to the satisfaction of the Court that the Company is unable to pay its debts the Court shall take into account the contingent and prospective liabilities of the Company.

"SMALL CAPITALIST."—Your methods of finance are distinctly unsound and I strongly counsel you not to operate on the lines you set out. In theory it sounds magnificent, but the method in practice is distinctly dangerous. You say you can borrow on the shares you buy to the extent of 75 per cent. of their market value, and that by reinvesting this 75 per cent. and re-borrowing again on the investment, you are in a position to hold securities to a much larger amount than the small capital you have actually available, and providing you can rely upon the dividends regularly, which are in excess of the amount of interest you would have to pay on your loans, you can see your way to make a nice revenue.

This system of finance is known as "Pig on Pork," and is by no means new or novel. What you must calculate is, what would happen in the event of your securities deferring payment of dividend, and the consequent fall in the quotation. Your system would then topple over at once.

AN IRISH AIRCRAFT INDUSTRY.

It is stated in the Dublin Press that the establishment of an aeroplane factory for Ireland is at present under consideration by the Air Ministry. Members of the Nationalist Party have had interviews with officials of the Ministry, and it is hoped that a definite statement on the subject will be made shortly.

Two motor manufacturers in Dublin are prepared to invest large sums in the development of the project. One of them has agreed to contribute up to £50,000 for the purpose of manufacturing engine parts.

NEW PREMISES.

It should be noted that the Palmer Tyre, Ltd., have vacated their Belmont Row premises, in Birmingham, and are now installed in their new showrooms, depot, and offices at Broad Street Chambers, where all Birmingham inquiries and communications should now be addressed.

A PAPER-SAVING CALENDAR.

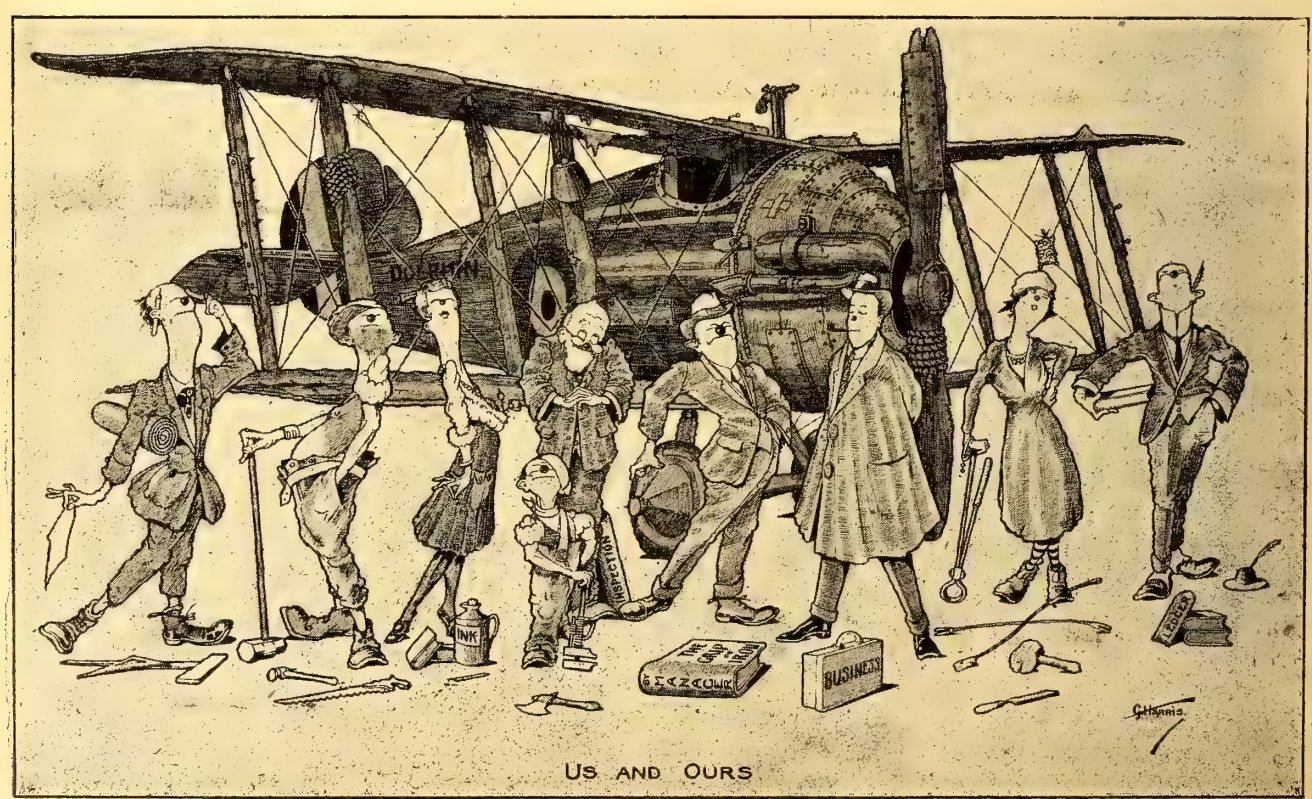
Now that such restrictions are placed upon the output of paper, considerable interest attaches to the manufacture of advertisement calendars, in which the use of paper is almost entirely eliminated.

Such a calendar is now being issued by Brown Bros., Ltd., of Great Eastern Street, E.C., and regular customers, who do not receive one shortly, are requested to communicate with the firm.

The calendar consists of a table mirror with a straw-board back, and adjustable days of the week and of the month show through spaces cut in the silvering. Altogether, the calendar forms a useful reminder of the firm which issues it.

QUALITY IN TYRES.

The care given by the Beldam Tyre Co., Ltd., both to design and quality of their tyres ensures a steady and ever-increasing demand. Their business has thus assumed a state of steady progress—of which the declaration by the directors of an interim dividend on the ordinary shares for the six months ending Sept. 30th last at the rate of 10 per cent. per annum is convincing evidence.

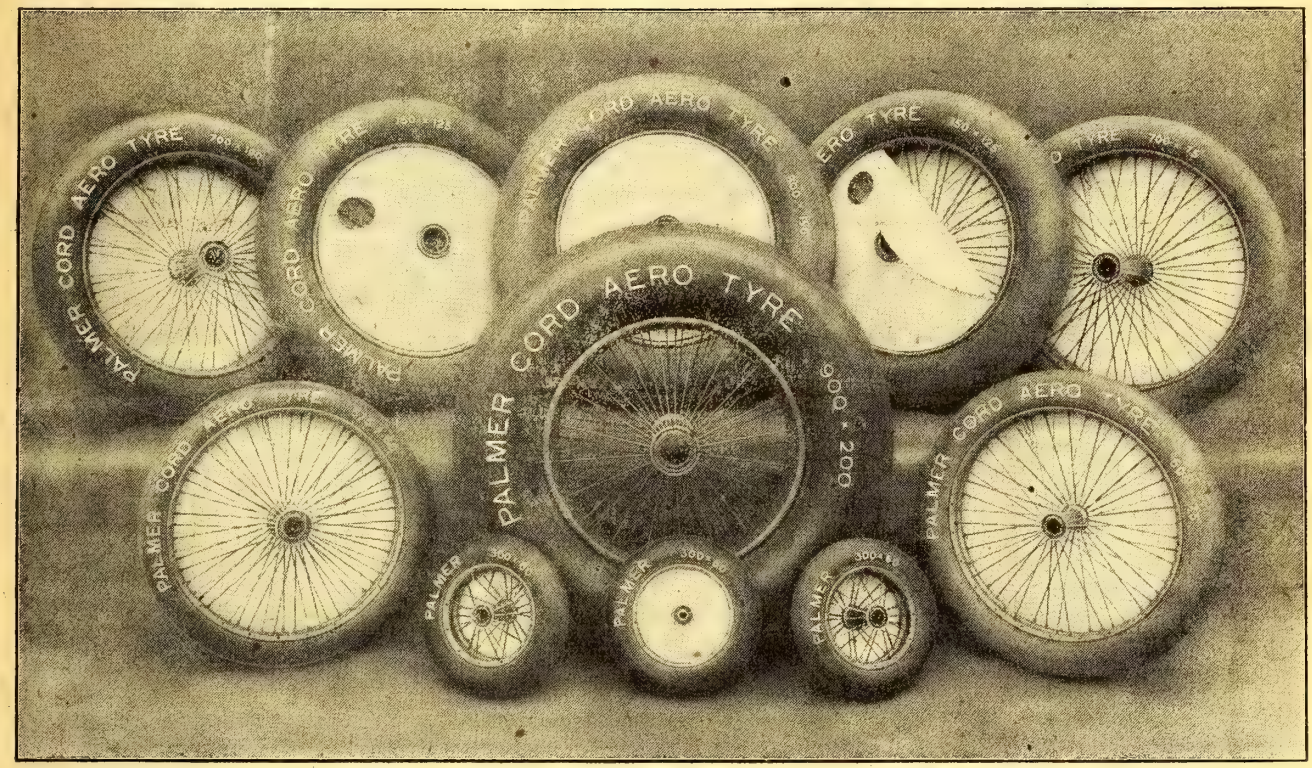


US AND OURS

AIRCRAFT FINANCE.—**General manager, works manager, shop-foreman, draughtsman,** *et hoc genus omne,* **of an aeroplane factory, all well satisfied with their efforts to help the new War Loan.**

PALMER

LANDING WHEELS & TYRES



STANDARD SIZES:

Tyre Sizes	Wheel No.	Hub Length	Hub Bore	Track Line	Tyre Sizes	Wheel No.	Hub Length	Hub Bore	Track Line	Tyre Sizes	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m	m/m	m/m			m/m	m/m	m/m			m/m	m/m	m/m
300×60	16	111.12	25.4	Central	700×75	*80	178.	44.45	132/46	750×125	96	178.	55.	132/46
,,	17	72.39	12.7	Central	,,	*91	178.	31.75	132/46	800×150	82	185.	55.	135/50
450×60	30	89.	31.75	Central	,,	*98	178.	44.45	Central	,,	85	185.	55.	Central
575×60	111	150.	38.09	104/46	700×100	92	185.	55.	135/50	,,	†36	185.	55.	135/50
,,	21	160.	28.	Central	,,	95	185.	55.	Central	,,	†40	185.	60.32	135/50
,,	34	150.	31.75	104/46	,,	77	178.	44.45	132/46	1000×150	97	250.	65.4	Central
650×65	78	178.	44.45	132/46	,,	93	150.	40.	Central	,,	102	185.	55.	125/60
,,	100	178.	38.09	132/46	,,	33	150.	38.09	Central	,,	201	185.	60.32	125/60
,,	101	178.	31.75	132/46	,,	99	178.	38.89	132/46	900×200	39	185.	55.	Central
600×75	111	150.	38.09	104/46	,,	96	178.	55.	132/46	,,	42	185.	60.32	125/60
,,	21	160.	28.	Central	750×125	92	185.	55.	135/50	,,	47	185.	55.	125/60
,,	34	150.	31.75	104/46	,,	95	185.	55.	Central	,,	202	185.	60.32	Central
700×75	78	178.	44.45	132/46	,,	77	178.	44.45	132/46	1100×200	52	185.	55.	116/69
,,	100	178.	38.09	132/46	,,	93	150.	40.	Central	,,	57	185.	55.	Central
,,	101	178.	31.75	132/46	,,	33	150.	38.09	Central	,,	203	185.	60.32	116/69
					,,	99	178.	38.89	132/46	,,	204	185.	60.32	Central

**Wheels Nos 80, 91 and 98 are fitted with a wider and stronger rim, and the 700×75 tyres when fitted to this rim caliper 83 m/m.*

†Wheels Nos. 36 and 40 are of stronger type than the other wheels for 1100×150 tyres.

THE PALMER TYRE LIMITED

Contractors to the Admiralty and to the War Office,

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PARIS: 24, Boulevard de Villiers, Levallois-Perret.

(*Continued from page* 1890.)

appt. of Lt. (temp. Capt.) C. E. Wardle, R.F.C., Spec. Res., is post-dated to Nov. 1st.

Wing Comdr.—Capt. (temp. Maj.) A. Shekleton, R. Muns. Fus., from a Sqdn. Comdr., and to be temp. Lt.-Col. whilst so empld., Nov. 21st.

Sqdn. Comdrs.—Capt. (temp. Lt.-Col.) C. F. Lee, Yeo., T.F., a Staff Officer, 1st Cl. (graded as an A.A.G.), and to retain his temp. rank (but without pay or allowances of that rank) whilst specially empld. (Nov. 17); Lt. (temp. Capt.) F. W. Stent, Spec. Res., from a Flt. Comdr., and to be temp. Maj. whilst so empld., Nov. 21st.

Flt. Comdrs —From Flying Officers.—Lt. E. Y. Hughes, R.F.A., T.F., and to be temp. Capt. whilst so empld., Nov. 30th; Capt. B. U. S. Cripps, M.C., Welsh R.; and to be temp. Capts. whilst so empld. :—Lt. R. Hilton, M.C., R.A.; Temp. Sec. Lt. (temp. Lt.) G. F. W. Zimmer, Gen. List; Lt. F. J. Watts, 1ssex R., T.F.; Sec. Lt. H. L. Tracy, Spec. Res. (Dec. 2nd); Sec. Lt. S. J. Schooley, Spec. Res. (Dec. 3rd).

Balloon Wing Comdr.—Capt. (temp. Maj.) F. M. Roxby, N. Staff R., Spec. Res., from a Balloon Co. Comdr. (graded as a Sqdn. Comdr.), and to be temp. Lt.-Col. whilst so empld., Nov. 1st.

Adjt.—The appt. of Sec. Lt. (temp. Capt.) J. T. Pym, E. Surr. R., Spec. Res., notified in "Gazette" of Sept. 24th, is antedated to July 30th.

Special Appts.—Graded as Equipt. Officers, 1st Cl.—From graded as Equipt. Officers, 2nd Cl., Oct. 15th.—Temp. Capt. G. A. Scott, Essex R.; and to be temp. Capts. while so empld.: —Sec. Lt. (temp. Lt.) A. G. Saxty, Som. L.I., T.F.; Sec. Lt. (temp. Lt.) C. D. Kershaw, W. Rid. R., Spec. Res.

Schools of Instruction.—Armament School.—Comdt.—Graded as a Wing Comdr.—Capt. (temp. Lt.-Col.) A. C. H. MacLean, R. Scots, from Comdt., Central Flying School, and to be temp. Col. whilst so empld., Nove. 21st.

Asst. Comdt.—Graded as a Depot Comdr.—Capt. (temp. Maj.) A. C. Bishop, Yeo., T.F., from a Comdt. (graded as a Park Comdr.), and to be temp. Lt.-Col. while so empld., Nov. 21st.

Chief Instr. in Gunnery.—Graded as a Park Comdr.—Lt. (temp. Capt.) G. E. Smith, E. Yorks. R., from an Instr. in Gunnery (graded as an Equipt. Officer, 1st Cl.), and to be temp. Maj. while so empld., Nov. 21st.

Camp Comdt.—Graded as a Park Comdr.—Capt. T. B. Hornblower, R. Suss R., T.F., from an Adjt., and to be temp. Maj. whilst so empld., Nov. 21st.

Memoranda.—Temp. Hon. Lt. A. N. Barrett to be temp. Hon. Capt. whilst empld. as Inspr., Aeronautical Inspn. Dept., June 1st.

Qrmr.-Serjt. W. C. Ibbott, from R.F.C., to be Sec. Lt. for duty with R.F.C., Nov. 23rd.

* * *

The King has been pleased to approve of the award of the following honours, decorations, and medals to officers and man for services in action with enemy submarines :—

Distinguished Service Cross.

Flt. Sub.-Lt. (now Flt. Lt.) N. A. Magor, R.N.A.S.
Flt. Sub-Lt. R. Jarman, R.N.A.S.

Bar to the D.S.C.

Flt. Lt. E. J. Cuckney, D.S.C., R.N.A.S.

Second Bar to the D.S.C.

Flt. Comdr. T. D. Hallam, D.S.C., R.N.A.S

Distinguished Service Medal.

Actg Air Mech., 1st Gr., E. H. Clarke, O.N. F17921.

* * *

The following officers and man have been mentioned in dispatches :—

Flt. Lt. B. D. Hobbs, D.S.O., D.S.C., R.N.A.S.; Flt. Lt. J. L. Gordon, R.N.A.S.; Flt. Sub-Lt. (now Flt. Lt.) R. F. L. Dickey, D.S.C., R.N.A.S.; Flt. Sub-Lt. C. J. Clayton, R.N.A.S.; Obsr. Sub-Lt. K. G. Coles, R.N.A.S.

Air Mec., 2nd Gr., H. M. Davies, D.S.M., O.N. F20254.

* * *

The King has been pleased to approve of the award of the following decorations and medals to officers and men of the Royal Naval Air Service :—

The Distinguished Service Cross.

Flt. Lt. R. G. Gardner, R.N.A.S.—In recognition of the great zeal and gallantry displayed by him on the night of October 15th, when a bombing raid was carried out on Bruges Docks and good results obtained in spite of heavy and accurate anti-aircraft fire. This officer has taken part in 36 bombing raids.

Flt. Lt. J. W. Alcock, R.N.A.S. (now prisoner).—For the great skill, judgment, and dash displayed by him off Mudros on Sept. 30th, in a successful attack on three enemy seaplanes, two of which were brought down in the sea.

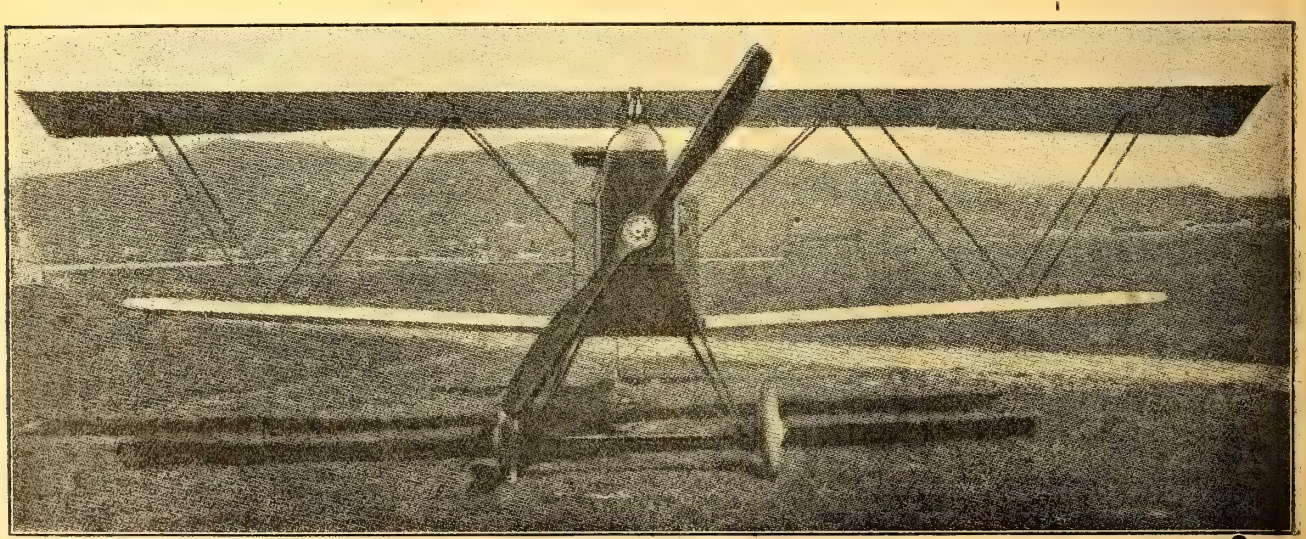
Flt. Sub-Lt. (now Flt. Lt.) C. F. M. Chambers, R.N.A.S.—During the combined naval and military operations in the neighbourhood of Lindi, East Africa, on June 10th and 11th, this officer flew his machine at all hours of the day under heavy fire with excellent results, bringing back to his commanding officer clear and concise reports.

Flt. Sub-Lt. (actg. Flt. Lt.) W. A. Curtis, R.N.A.S.—For conspicuous gallantry and devotion to duty. He has on many occasions destroyed and driven down out of control enemy machines. On Oct. 21st, in a combined attack with two other pilots, he sent down an enemy machine in flames, and 20 minutes later he followed another enemy scout from 10,000ft. to 2,000ft., and sent it down in a vertical dive, which ended in a crash.

Obsr. Lt. C. Chapman, R.N.A.S.—In recognition of the great gallantry and skill displayed by him on Oct. 18th, when he carried out a photographic reconnaissance in spite of adverse conditions and intense cold, as a result of which he was severely frostbitten. He has repeatedly carried out valuable photographic reconnaissances at long distances behind the enemy lines under very heavy and extremely accurate anti-aircraft fire and despite the tactics of enemy aircraft.

Flt. Sub-Lt. C. R. Lupton, R.N.A.S., Flt. Sub-Lt. E. Dickson, R.N.A.S., and Obsr. Sub-Lt. W. L. Hill, R.N.A.S.—For conspicuous gallantry and devotion to duty in a bombing raid on Thourout Railway Station and Varsennaere Aerodrome on Oct. 25th. These officers volunteered for the expedition in spite of extremely unfavourable weather conditions. They have all previously taken part in many bombing raids.

Flt. Sub-Lt. J. G. Manuel, R.N.A.S.—For conspicuous gallantry and devotion to duty in air fights and bombing raids, particularly on Sept. 26th, when he attacked alone the Abeele Aerodrome, dropping his bombs from about 1,500 ft., with good results. A machine-gun then opened fire on him, but he dived down low and silenced it by firing 50 rounds from his machine-gun.



The S.V.A. single-seater fighter constructed by the Societa Gio Ansoldo, of Genoa. The peculiar arrangement of the interplane struts which obviates the use of flying and landing cables is clearly indicated. Fore and aft "incidence bracing" is still employed.

THE

'Guardian Angel' Parachutes



THE ONE THING WANTING.

The details of the flight of the Handley Page twin tractor Battleplane, driven by two Rolls-Royce engines, each of 275 h.p., from Hendon to Constantinople and back, have now been made known, and nothing yet in flying has so appealed to popular imagination. More than anything else this wonderful record achievement has enabled the public to gauge the long-range possibilities of the near future. The long arm of the Air!

On board were Commander Savory, Lieut. McClellan, Lieut. Rawlings and two mechanics, whose names also should have been made public. Besides these five men, were carried their baggage, beds and bedding, two tool boxes and spares practically equivalent to another engine, three radiators, three tail skids, three wheels, two four-bladed propellers, and sufficient ammunition for all the work to be done in the East. The total weight of the machine and its load was over six tons; that of the kit, spares and cargo 6,000 lbs.

The machine, in its 2,000 mile journey, crossed mountain peaks from 8,000 to 10,000 ft. in height, but in Constantinople the night-bombing of the Goeben, the Head Quarters of the German General Staff, the Turkish War Office, and the other pre-determined objectives, was acomplished at a height of only 800 ft. Our flying men were fired on in Constantinople, and all the way down the Sea of Marmora, and on arrival back at the base no fewer than 26 bullet holes were found in the machine. One lucky shot partially disabled the oiling system of one engine, and the return journey was carried out with the machine flying on one engine only.

It was a great and brilliant performance, alike of men and machinery—attended with the best of good luck! We are told of the results of one "lucky shot"; but what would have happened if, in this stream of petrol-firing bullets, a second "lucky shot" had penetrated the tanks? There could, alas, have been no luncheon at the Café Royal; and no report of work done!

In a cargo of 6,000 lbs. it should not have been difficult to find room for five Parachutes, the whole weighing less than 200 lbs. Flying officers and men, however dangerous the work they have to undertake, will not yet themselves ask for these safeguards. Superior authority should *order* them to take them. Is it not well worth while, when the means exist, to take the precaution to preserve to the country the *accumulated experience* of five such men from needless dissipation in a fiery furnace?

The "Guardian Angel" Parachutes are designed and built on the same sound engineering principles as the Rolls-Royce engines which made the above splendid record possible. They are the *only* parachutes that can be used from aeroplanes flying at speed; the *only* parachutes that will open and bring down their men safely to earth from any height above 200 ft., and yet we (and others) are still being told that they are *too expensive for general adoption*!

Oh, these ours-is-just-as-good-and-ever-so-much-cheaper men! When so many millions are being expended, can't the Country afford to give, at all events, its Flying Men *the best?*

IF THE "GUARDIAN ANGEL" PARACHUTES ARE *NOT* THE BEST—LET THE BEST BE BROUGHT FORWARD AND TAKE THEIR PLACE.

The operations of the Air Service will probably have greater effect than any other weapon in determining the nations that this must be the last war.—Mr. Lloyd George at Gray's Inn.—14th Dec., 1917.

The great asset of the Flying Services is the young Briton, whether born in these lands or in the Dominions oversea. He makes the ideal fighter—courageous, daring, with heaps of initiative. Our duty is to see that he obtains all he wants.—Lord Rothermere at Gray's Inn.—14th Dec., 1917.

RELIABILITY—first. RELIABILITY—second. RELIABILITY—ALL THE TIME.

E. R. CALTHROP'S Aerial Patents, Ltd.,

ELDON STREET HOUSE, ELDON STREET, LONDON, E.C.2.

Telephones (2 lines) London Wall 3266 and 3267. Telegraphic and Cable Address—"Savemalivo-Ave-London."

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

Obsr. Sub-Lt. T Terrell, R.N.A.S.—For conspicous gallantry and devotion to duty on a long-distance bombing raid on Oct. 28th, when a direct hit was obtained on a munitions factory. He was heavily attacked by machine-fun fire on his homeward journey, which was carried out under exceedingly trying conditions. He has also carried out other bombing raids and a number of photographic reconnaissances.

A Bar to the Distinguished Service Cross.

Flt. Lt. (actg. Flt. Comdr.) J. S. T. Fall, D.S.C., R.N.A.S.—In recognition of the conspicuous courage displayed by him in attacking enemy aircraft in superior numbers on many occasions. On Oct. 15th he attacked an enemy machine from in front at very close range, at times within 25 yards. He then turned sharply and attacked from behind, sending the enemy machine down spinning on its back and emitting great volumes of black smoke.

Flt. Lt. H. T. Mellings, D.S.C., R.N.A.S.—For the great skill, judgment, and dash displayed by him off Mudros on Sept. 30th, 1915, in a successful attack on three enemy seaplanes, two of which were brought down in the sea.

A Second Bar to the Distinguished Service Cross.

Flt. Lt. (actg. Flt. Comdr.) J. S. T. Fall, D.S.C., R.N.A.S.—In recognition of his services on Nov. 12th and 13th, 1917, when he had successful engagements with three enemy machines. He has always shown great courage and gallantry in the face of the enemy, and maintained a high record of achievement, having destroyed many enemy machines.

The Distinguished Service Medal.

Ldg. Mech. S. H. Pinchen, O.N. F2932.
Actg. Air Mech., 1st Gr., G. Smith, O.N. F4430.

* * *

The following officer has been mentioned in dispatches :—
Flt. Sub-Lt. (now Flt. Lt.) P. K. Fowler, R.N.A.S.

* * *

The following decorations for distinguished services rendered during the war have been conferred by the President of the French Republic :—

Legion d'Honneur.
Croix d'Officier.

Capt. H. D. Briggs, R.N. (Wing Capt., R.N.A.S.).

Croix de Guerre.

Flt. Lt. B A. Smart, D.S.O., R.N.A.S.

* * *

Correction.

In the " Gazette " of Aug. 11th, for Air Mech., 2nd Gr., F. Anderson, O.N. F7389, read Ldg. Mech. S. F. Anderson, O.N. F12676.

War Office, Dec. 20th.

REGULAR FORCES—Establishments—R.F.C.—Mil. Wing.

Flt. Comdrs.—Temp. Lt. F. O. Soden, Gen. List, from a Flying Officer, and to be temp. Capt. whilst so empld., Dec. 5th.

Balloon Co. Comdrs.—(Graded as Flt. Comdrs.).—And to be temp. Capts. whilst so empld. :—Lt. A. Knight, N. Lan. R., from a Balloon Officer, Nov. 2nd. Sec. Lt. (temp. Lt.) D. C. Bell, Midd'x R., T.F., from a Balloon Comdr., Dec. 1st.

Depot Comdrs.—From Park Comdrs. and to be temp. Lt.-Cols. whilst so empld., Dec. 15th. Capt. (temp. Maj.) L. F. R. Fell, D.S.O., Spec. Res. ; Qrmr.. and Hon. Lt. (temp. Maj.) J. Starling.

Park Comdrs.—From Equipt. Officers, 1st Cl., and to be temp. Majs. whilst so empld , Dec. 15th :—Temp. Capt. E. B. Palmer, A.S.C., Temp. Capt. E. M. Bettington, Gen. List.

Equipt. Officers, 1st Cl.—From the 2nd Cl., and to be temp. Capts. whilst so empld. :—Lt. B. J. Nicholson, Spec. Res., Aug. 28th. Qrmr. and Hon. Maj. (temp. Lt.) A. Landen ,D.S.O., North'd Fus., Nov. 16th. Temp. Capt. E. R. Moxey, Gen. List, Lt. M. D. McFarlane, Midd'x R., and to be temp. Capt. whilst so empld., Nov. 21st.

Experimental Officers, 1st Cl.—Graded as an Equipt. Officer, 1st Cl.—Qrmr. and Hon. Lt. (temp. Capt.) W. Thomas, from an Equipt. Officer, 1st Cl., and to retain his temp. rank while so empld., Nov. 5th.

Gen. List.—To be temp. Sec. Lts.—1st Cl. Air Mech. C. J. M. Evans, from R.F.C. ; 2nd Cl. Air Mech. R. J. Divers, from R.F.C., Sept. 28th. Cpl. A. G. Oliver, from R.F.C. ; Cpl. W. E. Le Feuvre, from R.F.C. ; Serjt. S. F. Baker, from R.F.C. ; 1st Cl. Air Mech. P. J. T. Baddiley, from R.F.C. ; 2nd Cl. Air Mech. W. H. Oliver, from R.F.C., Oct. 8th. 2nd Cl. Air Mech. C. E. Briant, from R.F.C., Oct. 16th. Tech. Serjt.-Maj. A. Forsyth, from R.F.C., Oct. 18th.

Memoranda.—C. H. Piroth to be temp. Hon. Lt. whilst empld. as Asst. Inspr., Aeronautical Inspn. Dept., June 1st.

The following from R.F.C., to be Sec. Lts. whilst serving with R.F.C. :—Temp. Serjt.-Maj. C. T. Davis, Oct. 8th. Serjt.-Maj. E. Whilton, Oct. 18th.

* * *

The names of the following have been brought to notice in dispatches for valuable services rendered in connection with Anti-Aircraft Services in the United Kingdom :—

Ashmore, Bt.-Col. (temp. Maj.-Gen.) E. B., C.M.G., M.V.O., R.A.

Banks, Sec. Lt. C. C., R.W. Fus. and R.F.C. ; Barraclough, Capt. E., R.G.A. ; Bell, Sec. Lt. (temp. Capt.) D. J., M.C., R.F.C., Spec. Res. ; Bishop, Sec. Lt. S., R.G.A., Spec. Res. ; Boreham, temp. Lt. (actg. Capt.) G. H., R.G.A. ; Brand, Lt. (temp. Capt.) C. J. G., M.C., R.F.C., Spec. Res. ; Breeds, Lt. A. H., R.G.A., Spec. Res. ; Brittain Lt. (actg. Maj.) W. B., R.G.A. ; Buckle, Capt. (actg. Lt.-Col.) C., R.G.A.

Chabot, Lt. C. J., R.F.C., Spec. Res.

Dittman, Capt. (actg. Lt.-Col.) W. E., R.G.A.

Fooks, Lt. (temp. Capt.) P. E. B., R.G.A.

Goldsmith, Maj. E. J., R.G.A. ; Green, Temp. Capt. G. W. M., D.S.O., M.C., Gen. List and R.F.C. ; Gregory, Maj. (temp. Lt.-Col.), G. M. A., R.F.A.

Hankey, Maj. (temp. Lt.-Col.) Y. C. G. A., R.F.A., R. of O. ; Hardy, Lt. (actg. Capt.) H. I., R.G.A. ; Hargrave, Capt. (temp. Maj.) W. B., Suff. R. and R.F.C. ; Harrison, Sec. Lt. G. H., Midd'x R. and R.F.C. ; Haynes, Temp. Capt. W. H., R.F.C. ; Hedges, Temp. Capt. (temp. Lt.-Col.) F. R., Gen. List and R.F.C. ; Hinton, Lt. (actg. Capt.) W. H., R.F.A.

Lucas, Maj. (actg. Lt.-Col.) W. G., R.G.A.

Mather, Capt. W. H., R.E. ; Moore, Lt. (temp. Capt.) R. C., R.G.A.

Newton, Lt. H. A., R.G.A. ; Nicholson, Temp. Sec. Lt. M., R.F.C.

Orr, Capt. F. G., R.F.A.

Pratt, Sec. Lt. (temp. Capt.) S., R. Fus., Spec. Res. and R.F.C.

Rawlinson, Lt.-Col. A., C.M.G., R.G.A. ; Ridley, Lt. (temp. Capt.) C. A., D.S.O., M.C., R. Fus. and R.F.C.

Sutton, Lt. (temp. Capt.) C., R.F.C., Spec. Res.

Thompson, Lt.-Col. W. M., R.E. ; Thomson, Capt. (temp. Maj.) A. A. B., M.C., R. War. R. and R.F.C.

Watson, Capt. (temp. Lt.-Col.) A. T., R.F.C., Spec. Res. ; White, Maj. (actg. Lt.-Col.) Sir A. W., Bt., R.H.A.

* * *

Anness, No. 562665 L.-Cpl. (actg. Staff Serjt. Mech.) E. G., R.E. ; Archer No. 65434 Serjt. W. E., R.G.A. ; Arthur, No. 277960 Serjt. A., R.G.A. ; Askew, No. 119348 Actg. Serjt. H. E., R.G.A.

Baker, No. 873 Flt. Serjt. R., R.F.C. ; Baldwin, No. 168392 Cpl. M., R.G.A. ; Ballard, No. 145949 Actg. Bty. Qrmr.-Serjt. A. H., R.G.A. ; Barber, No. 119199 Gnr. W. P., R.G.A. ; Beaumont, No. 132110 Actg. Bombr. B. T., R.G.A. ; Beavis, No. 121940 Gnr. (actg. Serjt.) F. H., R.G.A. ; Beecham, No. 149103 Cpl. (actg. Serjt.) T. R., R.G.A. ; Birchall, No. 562637 Cpl. (actg. Serjt.) S., R.E. ; Blackman, No. 128503 Cpl. (actg. Serjt.) J. H., R.G.A. ; Brand, No. 465401 Mech. Staff-Serjt. T. M., R.E. ; Breething, No. 540443 Serjt. H. E., R.E. ; Buckle, No. 23308 Serjt. C. H., R.F.C. ; Busbridge, No. 157729 Actg. Serjt. J. A., R.G.A. ; Bush, No. 530076 Cpl. (actg. Staff Serjt.) T. W. C., R.E.

Calder, No. 8397 Temp. Serjt.-Maj. P. M., R.F.C. ; Carpenter, No. 540079 2nd Cpl. (actg. Serjt.) A., R.E. ; Clay, No. 118834 Serjt. W., R.G.A. ; Cormack, No. 683 Temp. Serjt.-Maj. W. D., R.F.C.

Davies, No. 92764 Actg. Serjt. A. F., R.G.A. ; Day, No. 70918 Gnr. R. J., R.G.A. ; Dodd, No. 27663 Serjt. C. F., R.G.A.

Easdown, No. 128479 Actg. Bombr. H., R.G.A. ; Eccles, No. 562876 L.-Cpl. (actg. Serjt.) P. J., R.E.

Fisher, No. 562597 Cpl. (actg. Serjt.) H. V., R.E. ; Flood, No. 121665 Co. Qrmr.-Serjt. S. E., R.G.A. ; Forrest, No. 11744 Flt. Serjt. A. F. J., R.F.C.

Gard, No. 321108, Actg. Serjt. A., R.G.A. ; Gilbert, No. 118492 Cpl. (actg. Serjt.) B , R.G.A. ; Goodwin, No. 119213 Actg. Bombr. F., R.G.A.

Hadley, No. 564128 Staff Serjt. (Mech.) C. A., R.E. ; Hatfield, No. 119362 Gnr. W. E., R.G.A. ; Hattersley, No. 562649 2nd Cpl. (actg. Staff Serjt.) (Mech.) A. W., R.E. ; Hincks, No. 148298 Actg. Bty. Qrmr.-Serjt. G. W., R.G.A. ; Hitchmough, No. 540090 Serjt. (actg. Staff Serjt.) W., R.E. ; Horsley, No. 66805 Serjt. W., R.G.A. ; Houghton, No. 121676 Actg. Serjt. W. P., R.G.A. ; Howe, No. 66943 Cpl. (actg. Serjt.) W., R.G.R. ; Howe, No. 21420 Actg. Co. Qrmr.-Serjt. W. R., R.G.A. ; Howell, No. 140205 Gnr. E. J. W., R.G.A. ; Hulme, No. 136953 Gnr. W., R.G.A. ; Hutton, No. 1775 Temp. Serjt.-Maj. A. E., R.F.C.

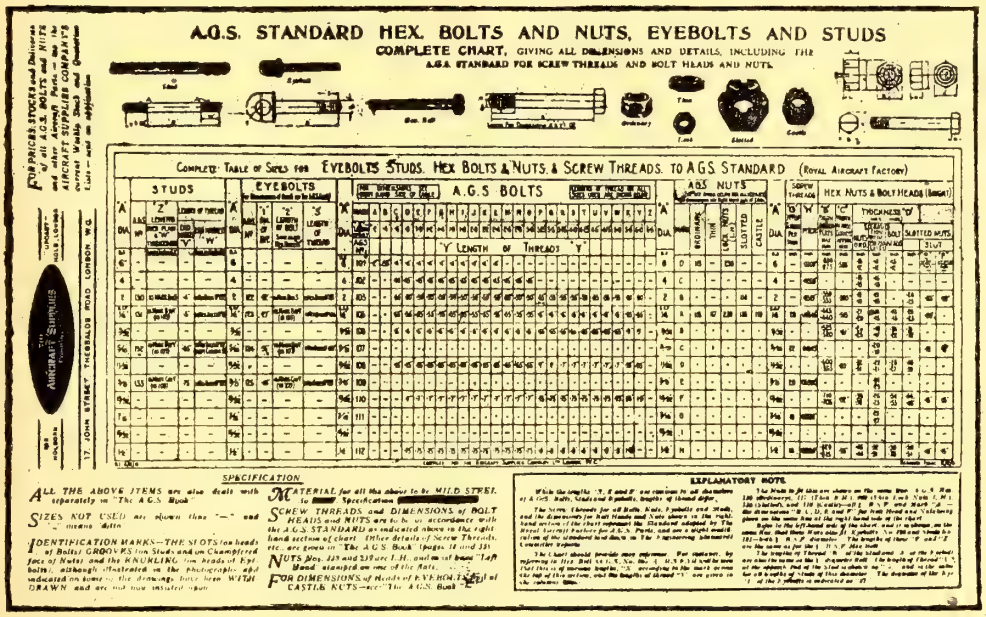
Jocelyn, No. 562452 Serjt. (actg. Staff Serjt.) (Mech.) W. C. J., R.E.

King, No. 562124 Co. Qrmr.-Serjt. J. R., R.E.

Laine, No. 465276 Serjt. R. W., R.E. ; Leigh, No. 121680 Cpl. N. H., R.G.A. ; Lemon, No. 562372 Serjt. (actg. Co. Qrmr-Serjt.) C. P., R.E. ; Letley, No. 540978 Spr. (actg. Cpl.) J., R.E. ; Light No. 125354 Actg. Bombr. T. A., R.G.A.

MacCarthy, No. 173730 Fitter Staff Serjt. M. J., R.G.A. ; Maguire, No. 128861 Serjt. J., R.G.A. ; Middleton, No. 562076 Serjt. (actg. Staff Serjt.) (Mech.) H., R.E.

Owen, No. 112228 Gnr. R., R.G.A.



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Rees, No. 128734 Actg. Bombr. R., R.G.A.; Richards, No. 279312 Serjt. W., R.G.A.; Rimmington, No. 284097 Bty. Serjt.-Maj. F. W., R.G.A.; Rose, No. 118857 Gnr. F. G., R.G.A.; Rowe, No. 321237 Actg. Serjt. J., R.G.A.

Shakespeare, No. 563557 Sec. Cpl. (actg. Cpl.) F., R.E.; Smith, No. 132593 Serjt. F., R.G.A.; Smith, No. 540030 Sec. Cpl. (actg. Serjt.) T. A., R.E.; Snook, No. SR/13 Temp. Serjt.-Maj. W. A. C., R.F.C.; Sullivan, No. 562339 Serjt. (actg. Co. Qrmr.-Serjt.) E. H., R.E.

Talbot, No. 137673 Gnr. S., R.G.A.; Thorpe, No. 562233 Cpl. (actg. Staff Serjt.) (Mech.) W. R., R.E.; Trevenen, No. 138182 Serjt. E. W., R.G.A.; Tupper, No. 137606 Gnr. F., R.G.A.; Twiney, No. 61956 Actg. Co. Qrmr.-Serjt. B. F., R.G.A.

Upcott, No. 352150 Serjt. S. F., R.G.A.

Williams, No. 127927 Actg. Serjt. R., R.G.A.; Williamson, No. 184385 Gnr. J. R., R.G.A.; Winny, No. 119288 Actg. Bombr. E. A., R.G.A.; Woodford, No. 119292 Actg. Cpl. G. W., R.G.A.; Woodford, No. 21148 Actg. Qrmr.-Serjt. F., R.G.A.; Woodyard, No. 530008 Serjt. (actg. Co. Qrmr.-Serjt.) J. A., R.E.

Yull, No. 530019 Cpl. (actg. Staff Serjt.) G.A., R.E.

War Office, Dec. 21st.

The names of the following have been brought to the notice of the Secretary of State for War for valuable services rendered in connection with anti-aircraft service in the United Kingdom, and, when applicable, an entry will be made in the records of service of officers and other ranks:—

Arnold, Sec. Lt. (actg. Lt.) A. F., R.G.A. (Spec. Res.); Arnott, Lt. (actg. Maj.) E. W., R.F.A.

Bennett, Capt. (temp. Maj.) L. M., R.F.C. (Spec. Res.); Brown, Lt. C. N., R.G.A.

Campbell, Capt. (actg. Maj.) C. M., A.M.I.E.E., R.E.; Coe, Lt. (temp. Capt.) C. G., R.F.C. (Spec. Res.); Corbet, Capt. (temp. Maj.) B. D'A., Res. of Officers, Gds.; Courtney, Lt. (temp. Capt.) R. A., R.F.C. (Spec. Res.); Cousin, Capt. (actg. Maj.) A. J., R.F.A.; Cox, Lt. (actg. Capt.) H. B., R.G.A.; Crane, Temp. Capt. L. F., N. Lan. R.

Daw, Temp. Lt. G. C., R.F.A.; Death, Sec. Lt. (temp. Lt.) T., R.F.A.; Dunn, Temp. Lt. W. A., R.F.C.

Ellison, Lt. (actg. Capt.) T. F., R.G.A.

Gay, Capt. L. H., S. Lan. R. (Spec. Res.); Mackenzie-Grieve, Maj. (actg. Lt.-Col.) J. A., R.A.; Gordon, Lt. L. C., R.G.A.

Halahan, Capt. (temp. Lt.-Col.) J. C., Res. of Officers, R. Dub. Fus. and R.F.C.; Hamlett, Lt. (temp. Maj.) H. W., R.F.A.; Harvey, Lt.-Col. J., D.S.O., R.F.C.; Herring, Lt. (actg. Capt.) F. W. M., R.E.; Howell, Sec. Lt. (temp. Lt.) A., R.E.; Hutchison, Lt.-Col. R. L., T.D., R.E.; Hunter, Temp. Lt. (actg. Capt.) W. A., Gen. Staff, Gen. List; Hunter, Maj. (actg. Lt.-Col.) D. H. K., R.F.A.

James, Lt. (temp. Capt.) W. H., R.E.; Jones, Maj. A. H., R.E.

Kennedy, Lt. (temp. Capt.) R. L., Hrs. and R.F.C.; King, Sec. Lt. G. O., R.E.

Langham, Temp. Lt. (temp. Capt.) C. A., R.F.A.; Lewis, Lt. O. W. H., R.G.A.

Mackay, Sec. Lt. (temp. Capt.) J. I., W. Rid. R. and R.F.C. (killed); Martin, Maj. A. R., T.F. Res. and R.F.C.; Millard, Capt. B. S., R.E.; Mitchell, Lt. W. A. P., R.G.A.; Molony, Lt.-Col. T. C. W., D.S.O., R.F.A.; Morgan, Temp. Maj. R. E. H., R.D.C., late R.A.

Nisbit, Lt. W. B., R.G.A.

Phillips, Temp. Capt. C. C., R.G.A.

Reader, Capt. (actg. Maj.) H. C., R.G.A.; Reid, Capt. (temp. Lt.-Col.) J. W., R.F.A., Res. of Officers; Roxby, Capt. (temp. Maj.), F. M., N. Staffs R. and R.F.C.

Schofield, Temp. Lt. H. U., R.G.A.

Thomson, Temp. Capt. G., R.G.A.

Whitfield, Capt. F. E. B., Welsh R. (Spec. Res.) and R.F.C.; Whittaker, Lt. (temp. Capt.) W. E. de B., L'pool R.; Williams, Sec. Lt. (actg. Lt.) H. H., R.G.A. (Spec. Res.); Wyncoll, Capt. H. E. F., M.C., Notts and Derby R. and R.F.C.

* * *

Alexander, No. 530075 Serjt. R. S., R.E.; Anderson, No. 127615 Gnr. A., R.G.A.; Andrews, No. 12081 Cpl. A. G., R.G.A.; Ashenden, No. 128597 Serjt. J. T., R.G.A.

Baker, No. 873 Serjt. (Flt. Serjt.) R., R.F.C.; Baker, No. 358453 Actg. Bombr. S. H., R.G.A.; Becton, No. 65434 Actg. Qrmr.-Serjt. B., R.G.A.; Beddall, No. 530035 Serjt. A., R.E.; Bennett, No. 262719 Actg. Serjt. G. W., R.G.A.; Bicknell, No. 5011 Serjt. (Flt. Serjt.) G. H. R.F.C.; Black, No. 92746 Actg. Serjt. A. McG., R.G.A.; Blake, No. 61992 Serjt. (actg. Co. Serjt-Maj.) W., R.G.A.; Blanchard, No. 103013 1st Air Mech. (actg. Cpl.) G., R.F.C.; Bode, No. 132184 Gnr. S., R.G.A.; Bodkin, No. 122284 Gnr. H., R.G.A.; Bold, No. 530105 Spr. C. A., R.E.; Boss, No. 101155 Cpl. (actg. Serjt.) J. W., R.G.A.; Brown, No. 350 Serjt. R., R.G.A.; Burgess, No. 16567 Gnr. F., R.G.A.; Burrow, No. 563408 Actg. Serjt. W. H., R.E.; Bush, No. 562365 Actg. Cpl. J. T., R.E.

Care, No. 697 Serjt. A. H., R.F.C.; Chandler, No. 147991 Cpl. (actg. Serjt.) C. H., R.G.A.; Cooley No. 96458 Actg. Serjt. A. J., R.G.A.; Cox, No. 118836 Co. Qrmr.-Serjt. A. E., R.G.A.; Crick, No. 90354 Cpl. A. A., R.G.A.; Cross, No. 119227 Actg. Serjt. W. H., R.G.A.; Crowe, No. 4199 Serjt. G., R.G.A.

Davidson, No. 92768 Gnr. C., R.G.A.; Davies, No. 142478 Serjt. J., R.G.A.; Davies, No. 126856 Gnr. A. J., R.G.A.; Davies, No. 119294 Actg. Full Bombr. L., R.G.A.; Derbyshire, No. 118716 Actg. Cpl. J., R.G.A.; Dixon, No. 125451 Serjt. A. J., R.G.A.; Donegan, No. 53052 Pte. (actg. Regtl. Qrmr.-Serjt.) M. W., R.D.C.; Downer, No. 119222 Serjt. E., R.G.A.

Edwards, No. 10361 Serjt. (Flt. Serjt.) J., R.F.C.; Emerson, No. 562495 Actg. Serjt. B. C., R.E.; Emmerson, No. 50881 L.-Cpl. (actg. Co. Qrmr.-Serjt.) W. H., R.D.C.; Eves, No. 6255 Serjt. (Flt. Serjt.) B. B., R.F.C.

Fagg, No. 562628 Actg. Staff Serjt. Mech. C. H., R.E.; Farrow, No. 8473 Cpl. F. S., R.F.C.; Fell, No. 465132 Staff Serjt. J., R.E.; Fenn, No. 149544 Actg. Serjt. A. J., R.G.A.; Fenn, No. 128865 Actg. Bombr. F. J., R.G.A.; Frizelle, No. 28287 Actg. Co. Qrmr.-Serjt. T. J., R.G.A.

Gardiner, No. 90262 Serjt. W. H., R.G.A.; Green, No. 119232 Gnr. W. W., R.G.A.

Hale Hall, No. 122198 Serjt. R., R.G.A.; Halford, No. 358196 Gnr. H. E., R.G.A.; Harman, No. 2603 Serjt. (Flt. Serjt.) F. H. L., R.F.C.; Harris, No. 136946 Actg. Bombr. A., R.G.A.; Harvey, No. 132611 Actg. 3rd Cl. Mr. Gnr. G., R.G.A.; Haywaard, No. 518015 Actg. Co. Qrmr.-Serjt. R., R.E.; Helliwell, No. 19892 Serjt. G., R.F.C.; Hick, No. 466182 Serjt. J., R.E.; Hill, No. 2060 Serjt. G. E., R.F.C.; Hill, No. 279772 Actg. Serjt. W., R.G.A.; Howe, No. 1773 Temp. Serjt.-Maj. V., R.F.C.; Hunt, No. 562361 Actg. Serjt. G. W., R.E.

Inns, No. 562590 Actg. Serjt. G. E., R.E.

Jacobs, No. 562260 Actg. Cpl. C. W., R.E.; James, No. 376444 Actg. Serjt. J. H., R.G.A.; James, No. 563129 Actg. Serjt. R. H., R.E.; Jennings, No. 5280 Serjt. (Flt. Serjt.) H., R.F.C.; Johnson, No. 2592 Serjt. (Flt. Serjt.) H. N., R.F.C.; Jolly, No. 284120 Serjt. A., R.G.A.; Jones, No. 145943 Actg. Serjt. G. B., R.G.A.

King, No. 119241 Actg. Sergt. C. D. W., R.G.A., Knowles, No. 564063 Actg. 2nd Cpl. J. B., R.E.; Manning, No. 119371 Gnr. H., R.G.A.; Marrows, No. 530313 Cpl. C. D., R.E.; Mitchell, No. 10894 Serjt. A., R.F.C.; Monk, No. 174870 Actg. Bombr. A. E., R.G.A.; Muir, No. 18501 Serjt. R. W., R.F.C.

Newbolt, No. 562202 Actg. Serjt. F. W., R.E.; Nicholls, No. 1321 Serjt. (Flt. Serjt.) R., R.F.C.; Nixon, No. 92787 Actg. Cpl. J., R.G.A.

Padbury, No. 562139 Actg. Serjt. J., R.E.; Page, No. 168667 Serjt. T. J., R.G.A.; Palmer, No. 121554 Gnr. A., R.G.A.; Payne, No. 14006 Cpl. H., R.F.C.; Pearce, No. 530295 Serjt. W., R.E.; Pike, No. 3092 Serjt. (Flt. Serjt.) C. F., R.F.C.; Pringle, No. 94534 Gnr. P., R.G.A.

Ralph, No. T./22735 Pte. (actg. Staff Serjt.) (Mechanist) A. J., A.S.C. (M.T.); Robinson, No. 540541 Actg. Staff Serjt. F. A., R.E.; Rushworth, No. 118493 Cpl. S., R.G.A.

Salmon, No. 118828 Bombr. H. E., R.G.A.; Sanders, No. 143930 Actg. Serjt. S. G., R.G.A.; Schofield, No. 563888 Spr W. H., R.E.; Shacklady, No. 563722 Actg. Cpl. A., R.E.; Shaw, No. 3065 Serjt. (Flt. Serjt.) G. W., R.F.C.; Shotter, No. 562602 Actg. Serjt. A. H., R.E.; Smith, No. 97651 Gnr. J., R.G.A.; Smith, No. 562505 Actg. Cpl. P. C., R.E.; Spall, No. 136779 Serjt. P. J., R.G.A.; Squires, No. 88661 Actg. Cpl. H. J., R.G.A.; Stead, No. 128736 Actg. Full Bombr. W. S., R.G.A.; Strachen, No. 562442 Actg. Co. Grmr.-Serjt. R. J., R.E.

Taylor, No. 128741 Serjt. F., R.G.A.; Taylor, No. 157796 Serjt. W., R.G.A.; Terry, No. 118696 Actg. Cpl. J. J., R.G.A.; Tingley, No. 89622 Bty. Serjt.-Maj. H., R.F.A.; Tomkinson, No. 132221 Serjt. A., R.G.A.; Turk, No. 540094 Actg. Serjt. H. A., R.E.

Walker, No. 465421 Actg. Staff Serjt. Mechanist D. J., R.E.; Wall, No. 121939 Actg. Bty. Qrmr.-Serjt. E. T., R.G.A.; Wall, No. 148124 Serjt. T., R.G.A.; Wells, No. 40260 Cpl. H., R.F.C.; Westfield, No. S/38954 Pte. (actg. Staff Serjt.-Maj.) E. N., A.S.C.; Weston, No. 20551 Temp. Serjt.-Maj E. S., R.F.C.; Williams, 12176 Serjt. (Flt. Serjt.) W., R.F.C.; Wilson, No. 22600 Cpl. C. J., R.F.C.; Wooberry, No. 3401 Cpl. (actg. Serjt.) E., R.F.C.; Worrall, No. 168794 Cpl. (actg Serjt.) J., R.F.A.

Youngman, No. 284280 Serjt. H. W., R.G.A

FROM THE COURT CIRCULAR.

Buckingham Palace, Dec. 19th.

The following officer had the honour of being received by the King this morning, when his Majesty invested him with the Insignia of Companion of the Order into which he has been admitted:—

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THE DISTINGUISHED SERVICE ORDER AND THE MILITARY CROSS AND BAR.

Capt. John Woodhouse, R.F.C.

* * *

The King then conferred decorations as follows:—

THE DISTINGUISHED SERVICE CROSS.

Flt. Lt. Henry Holden, R.N.A.S.
Flt. Lt. Charles McNicoll, R.N.A.S.
Flt. Lt. William Scott, R.N.A.S.

BAR TO THE MILITARY CROSS.

Maj. Arthur Thomson, R. War. R. and R.F.C

THE MILITARY CROSS.

Capt. Douglas Bell, R.F.C.
Capt. Christopher Brand, R.F.C.
Capt. Hugh Wyncoll, Sherwood Foresters and R.F.C.
Lt. Gordon Hawkins, Border R. and R.F.C.
Sec. Lt. D'Arcy Hilton, R.F.C.
Sec. Lt. Reginald Makepeace, R.F.C.

THE ALBERT MEDAL.

Sec. Lt. (formerly 1st Cl. Air Mech.) Harrie Harwood and Cpl. (formerly 2nd Cl. Air Mech.) Alfred Simms, both of the R.F.C.

At about 3 p.m. a fire broke out inside a large bomb store belonging to the Royal Flying Corps, which contained nearly 2,000 high-explosive bombs—some of which had very large charges—and a number of incendiary bombs, which were burning freely. Lt.-Col. Cyril Louis Norton Newall at once took all necessary precautions, and, assisted by 2nd Cl. Air Mech. (now Cpl.) Alfred Edward Simms, poured water into the shed through a hole made by the flames. He sent for the key of the store, and, with 1st Cl. Air Mech. (now Sec. Lt.) Harrie Stephen Harwood, Cpl. Henry Hearne, and Simms (to all of whom medals have been awarded), entered the building and succeeded in putting out the flames. The wooden cases containing the bombs were burnt, and some of them were charred to a cinder.

NAVAL.

The following appointments have been made in the Royal Naval Air Service:—

Dec. 18th.—Messrs. G. S. Hall and F. E. Jackson, both granted temp. commissions as Lt. (R.N.V.R.), seny. respectively Dec. 14th and 17th.

Dec. 19th.—Temp. commissions (R.N.V.R.) have been granted to the following:—Lieut.—T. le gee Pynches.

Dec. 20th.—Temp. commissions (R.N.V.R.) granted to the following, seny. Dec. 17th:—Lts.—W. P. Woodcock, A. R. Jackson, A. E. Taylor, and J. S. Street.

ADMIRALTY COMMUNIQUÉS.

Dec. 19th.—At noon on Dec. 18th a bombing raid was carried out by naval aircraft on Engel Aerodrome and dump. Several bombs burst close to sheds on the aerodrome and several direct hits are reported on the dump and railway sidings.

One enemy aircraft was shot down in flames and one out of control.

All our machines returned safely.

Dec. 20th.—On the night of Dec. 18th a raid was carried out by naval aircraft on Brugeoise works, Bruges. Direct hits were observed on buildings, one of which started a large fire, which was observed by the returning machines to be still burning. Large quantities of explosives were dropped.

Another raid was made at noon on Dec. 19th on Vlisseghem aerodrome (north-west of Bruges). Bombs were seen to burst among the sheds round the aerodrome, and several direct hits are reported.

One enemy aircraft was destroyed, and another driven down probably out of control.

One of our machines is missing.

THE CASUALTY LIST.

Reported Dec. 20th.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—Burnett, Flt. Sub-Lt. W. J., R.N.

ACCIDENTALLY INJURED.—Shearer, Flt. Lt. A. B., R.N.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER.—Magrath, Flt. Lt. (Paymaster, R.N.) W. S., R.N.

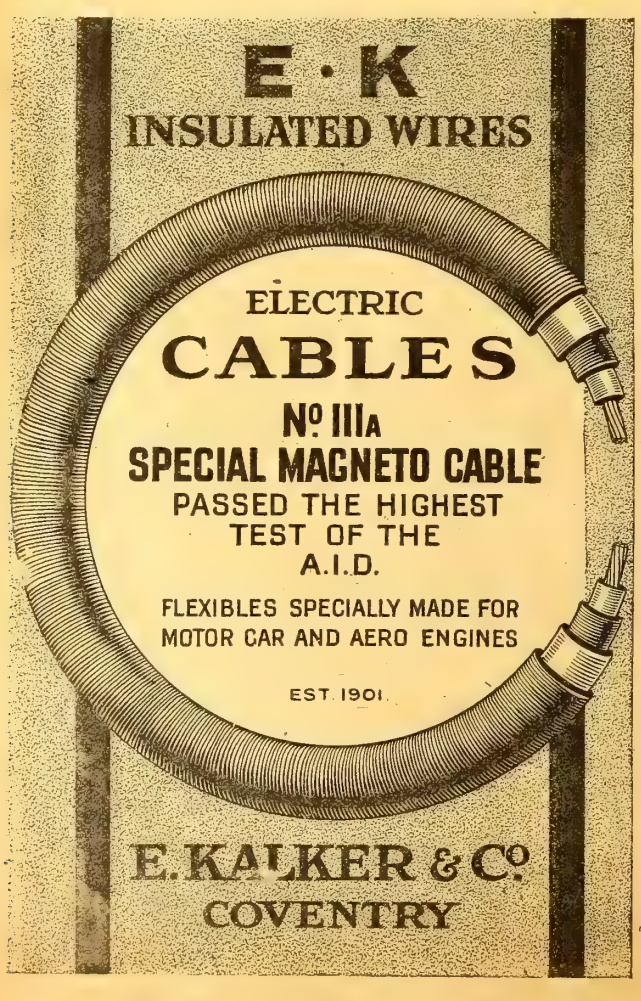
DROWNED.—Searles, F. N., Air Mech., 2nd Gde., F13151.

DIED OF ACCIDENTAL INJURIES.—Wood, R. W., Air Mech., 2nd Gde., F10371.

PERSONAL NOTICES.

MARRIAGES.

LEVEAUX—STEVENS.—On Tuesday, Dec. 18th, Lt. M. V. Leveaux, R.N.V.R., attd. R.N.A.S., was married to Maude, daughter of Mrs. David Stevens, of Camborne, Cornwall.



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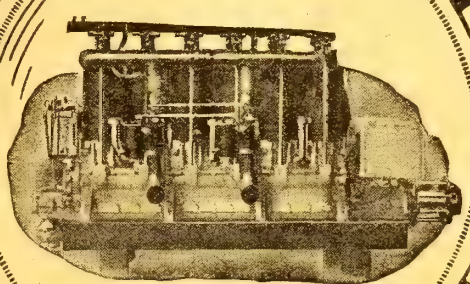
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C.O.C.

LYNE—BOND.—On Dec. 15th, at St. Michael's and All Angels', Bedford Park, W., C.P.O., Edgar Lyne, R.N.A.S., elder son of Mr. Edgar Lyne, of Christchurch Road, Streatham, was married to Gladys Mary Muir, elder daughter of Mr. and Mrs. H. T. Bond, of Queen Anne's Gardens, Bedford Park, W.

MILITARY.

G.H.Q. Communiqués.

Dec. 18th, 9.47 p.m.—On the 17th inst. heavy snow prevented flying, except on a small portion of the northern front.

In this locality a certain amount of work was done by our aeroplanes, and bombs were dropped upon a hostile aerodrome near Courtrai.

The enemy's trenches were also attacked with bombs and machine-gun fire.

At night Roulers station and aerodrome and Ledeghem and Menin stations were heavily bombed by us. In air fighting two German machines were brought down in our lines, and two others were driven down out of control.

One of our machines is missing.

Dec. 19th, 9.25 p.m.—Good work was done in the air on the 17th inst. by the Australian squadrons. Two of their pilots, who were attacked by many hostile scouts when employed on artillery work, succeeded in bringing down one of the enemy machines in our lines and dispersed the remainder.

On the 18th inst. the thick haze again limited flying to the northern part of the front, where a great deal of artillery and photographic work was done.

During the day over 150 bombs were dropped on the enemy's railway stations, sidings, and trenches, and many rounds were fired from the air into his trenches and billets.

Fighting in the air on this part of the front was intense all day, and resulted greatly in our favour. Seven hostile machines were brought down by our aeroplanes, one was shot down in our lines by anti-aircraft gun-fire, and another by the fire of our infantry. Three other hostile machines were driven down out of control. Three of our aeroplanes are missing.

After dark yesterday, our aeroplanes bombed St. Denis Westrem, Roulers, and Lichtervelde aerodromes, and Thourout, Ledeghem, Cambrai, and Menin railway stations.

All our machines returned.

Dec. 20th, 10.15 p.m.—Although the weather on the 19th inst. was very fine, a dense haze prevented observation by our aeroplanes for artillery. Many photographs were taken, however, of the enemy's aerodromes in back areas, and a few bombs were dropped on his hutments and billets.

Three hostile machines were brought down in air fighting, and two others driven down out of control.

One of our aeroplanes is missing.

War Office Communiqués.

Dec. 18th.—The G.O.C. the British Forces in Palestine reports :—

A hostile aeroplane has been driven down near Nablus.

It is interesting to note that in the bombing on boats and troops, and sheds at the north end of the Dead Sea our aeroplanes were flying 400 feet below sea level.

Dec. 19th.—The G.O.C. the British Forces in Macedonia reports :—

British and French aeroplanes carried out a combined raid on the railhead at Cestovo (north-west of Lake Doiran). Considerable damage was caused, and all the Allied machines returned safely. During the operation one of our escorts drove down a hostile aeroplane.

Our aircraft have also bombed Topoljani and Zili (east of Seres).

Home Command Communiques

Dec. 18th, 9.45 p.m.—Hostile aeroplanes crossed the Kent and Essex coast about 6.15 p.m., and proceeded towards London.

Some of the raiders reached the London district and dropped bombs.

Bombs were also dropped in Kent and Essex.

Reports of casualties and damage have not yet been received.

Our guns and aeroplanes were both in action.

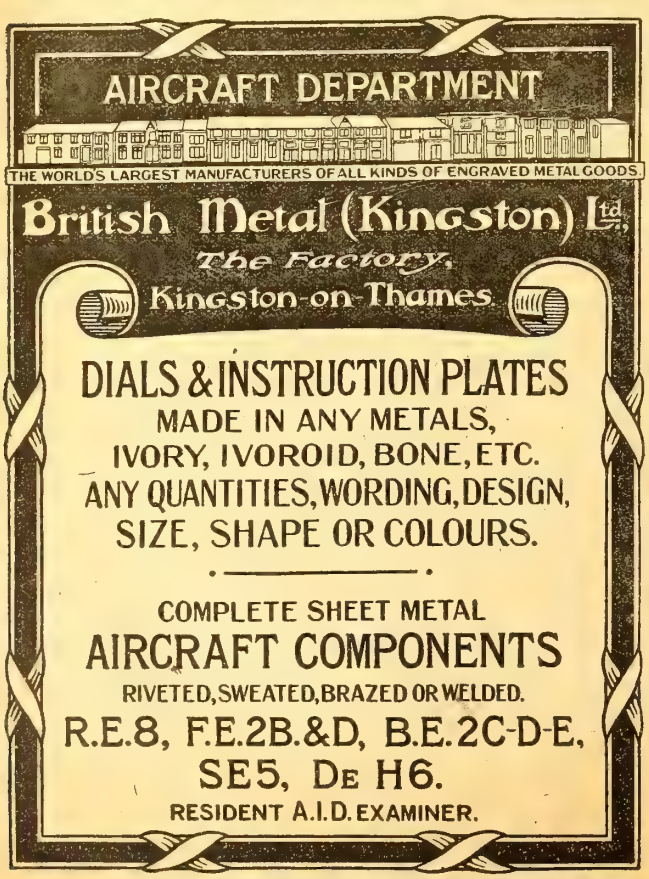
Dec. 19th, 11 a.m.—Latest reports indicate that from sixteen to twenty enemy aeroplanes took part in last night's air raid. Three groups of raiders crossed the Kent coast between 6.15 and 6.25 p.m., and three other groups crossed the Essex coast between 6.10 and 6.45 p.m. All six groups made towards London.

Most of the raiders were turned back by gunfire at various places, only about five machines actually reaching and bombing the capital between 7 and 8 p.m.

After the main attack on London had terminated, a single aeroplane made its way over the capital about 9 p.m.

One raider was hit by gunfire, and finally came down in the sea off the Kentish coast, two of its crew of three men being captured alive by an armed trawler. There is reason to suppose that another enemy aeroplane came down in the Channel, but this is unconfirmed at present.

One of our pilots attacked and fired two drums of ammunition into a raider as the latter was in the act of dropping bombs on London from a height of 13,000 feet. Another of our pilots also





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engaged the enemy over London, and a third in the vicinity of the capital at 11,000 feet.

All our machines returned safely.

Full reports of casualties and damage in London have not yet been received.

Bombs were also dropped in various places in Kent and Essex.

12.45 p.m.—Latest police reports state that

10 persons were killed and

70 injured in London

in last night's air raid.

Outside London only five persons were injured.

Several fires occurred, but the material damage is not serious. No damage was caused to naval or military establishments.

THE CASUALTY LIST.

Reported Dec. 19th.

KILLED.—Bennett, Sec. Lt. R. D., R.F.C.

DIED OF WOUNDS.—Nosworthy, Sec. Lt. C. W. M., R.F.A., attd. R.F.C.

Ross, Sec. Lt. A. C., R. Sco. Fus., attd. R.F.C.

WOUNDED.—Hetherington, Sec. Lt. J., R.F.C.

Hodgkinson, Lt. J. R., W. Yorks R., attd. R.F.C.

James, Sec. Lt. E. R., R.F.C.

Nelson, Sec. Lt. J. C. O., R.F.C.

Norton, Sec. Lt. O. I., R.F.C.

Parker, Sec. Lt. D., R.F.C.

Russell, Sec. Lt. D. C., R.F.C.

Rutherford, Sec. Lt. J. A., R.G.A., attd. R.F.C.

Sturrock, Sec. Lt. J., Yeo., attd. R.F.C.

West, Sec. Lt. J. D. F., R.F.C.

MISSING.—Calvert, Sec. Lt. T. W., R.F.C.

Dyer, Sec. Lt. H. A., R.F.C.

Gunn, Sec. Lt. M. G., R.F.C.

Palmer, Sec. Lt. A. W., R.F.C.

Whitaker, Sec. Lt. W., R.F.C.

Yeo, Sec. Lt. H. A., R.F.C.

AUSTRALIAN FORCE.—PREVIOUSLY REPORTED MISSING, NOW REPORTED DIED AS PRISONER IN GERMAN HANDS.—Holmes, Lt. K. W., F.C.

Reported Dec. 20th.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—Baker, Sec. Lt. A. R., R.F.C.

Barry, Lt. C., R. Ir. R., attd. R.F.C.

Cox, Sec. Lt. D. P., R.F.C.

Middleton, Sec. Lt. L. W., R.F.C.

Moody, Sec. Lt. C. A., R.F.C.

Snelgrove, Sec. Lt. H. D. B., R.F.C.

Winser, Sec. Lt. F. E., R.F.C.

WOUNDED.—Baker, Sec. Lt. J. A., R.F.C.

Boyd, Sec. Lt. J., High. L.I., attd. R.F.C.

Lally, Capt. C. T., M.C., R.F.C.

MISSING.—Brown, Sec. Lt. L. G. H., R.F.C.

Reed, Sec. Lt. C. S., R.F.C.

PREVIOUSLY REPORTED PRISONER, NOW REPORTED WOUNDED AND PRISONER IN GERMAN HANDS.—Ibbotson, Sec. Lt. H., R.F.C.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONERS IN GERMAN HANDS.—Harker, Sec. Lt. B., Lan. Fus., attd. R.F.C.

Morgan, Sec. Lt. W. G., R.F.C.

Ringer, Sec. Lt. E. C. S., R. Suss. R., attd. R.F.C.

PREVIOUSLY REPORTED WOUNDED, NOW REPORTED NOT WOUNDED.—Dreschfeld, Sec. Lt. S. E., R.F.C.

AUSTRALIAN FORCE.—WOUNDED.—Sheppard, Sec. Lt. F. H., Fl. Corps.

MISSING.—Ward, Lt. L. N., Fl. Corps.

CANADIAN FORCE.—WOUNDED.—Cole, Lt. J. E., Que R., attd. R.F.C.

Reported Dec. 21st.

AUSTRALIAN FORCE.—DIED OF WOUNDS.—Avers, Sec. Lt. S. W., F.C.

MISSING.—Clark, Sec. Lt. D. G., F.C.

Griggs, Lt. A., F.C.

* * *

CASUALTIES AMONG N.C.Os. AND MEN.

THE DATES ARE THOSE OF THE OFFICIAL LIST.

KILLED.

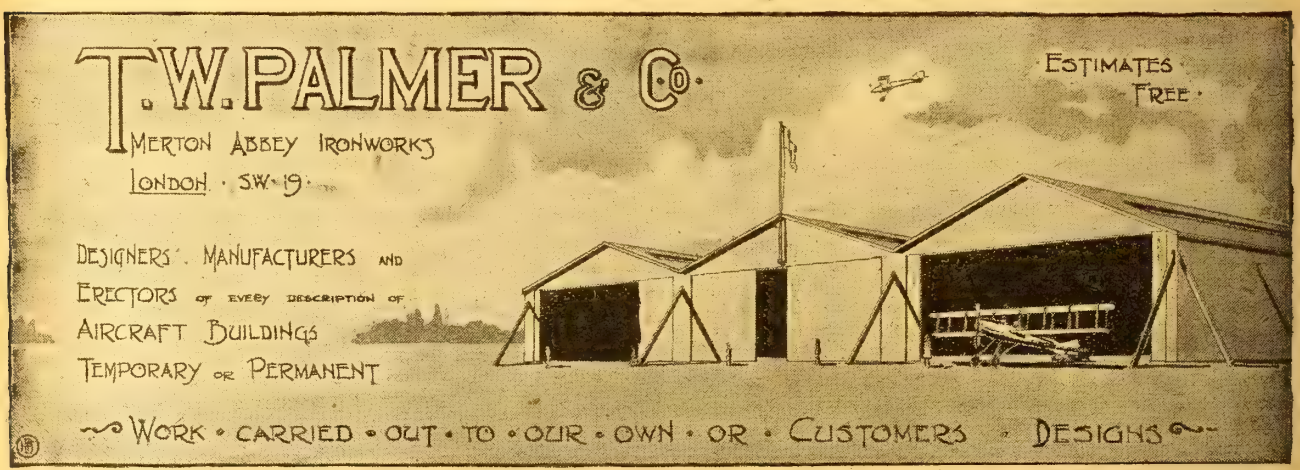
DEC. 11th.—R.F.C.—Florobin 5529 1st Class Air Mech. F. (Ingestre).

DEC. 13th.—Snelling 10013 1st Class Air Mech. E. A. (Brentford).

DEC. 15th.—Hobart 17034 2nd Class Air Mech. A. (Sutton).

DIED OF WOUNDS.

DEC. 15th.—R.F.C.—Booth 55471 3rd Class Air Mech. H. (Kegworth).



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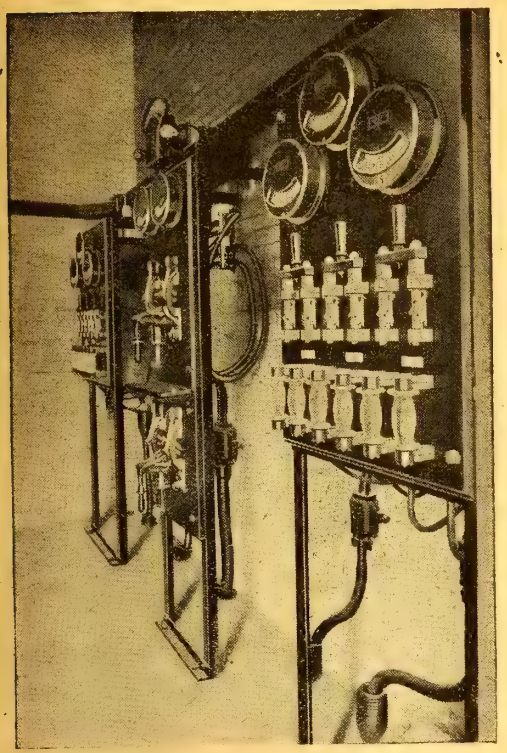
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DIED.

DEC. 14th.—R.F.C.—Harsant 5165 1st Class Air Mech. H. A. (Seven Kings).

WOUNDED.

DEC. 11th.—R.F.C.—Franks 5876 2nd Class Air Mech. H. (New Basford); Goodwin 4171 1st Class Air Mech. J. F. W. (East Dulwich, S.E.); Mould 9533 1st Class Air Mech. R. D. (Wood Green, N.); Rowe 13725 1st Class Air Mech. T. (Leiston).

DEC. 13th.—Clayton 52064 2nd Class Air Mech. A. E. (Northampton); Cullum 9271 2nd Class Air Mech. A. T. Poplar, E.); Eddington 958 Serjt. G. (Tottenham, N.); Pinder 20087 2nd Class Air Mech. G. E. (Wentbridge); Radford 7434 1st Class Air Mech. S. E. (Hutton); Rogers 55505 3rd Class Air Mech. J. W. (St. Thomas's Square, E.); Wall 58520 2nd Class Air Mech. J. G. (Drayton Green, W.).

DEC. 15th.—Johnson 8009 1st Class Air Mech. R. (Waterhouses); Morgan 14571 1st Class Air Mech. L. H. (Westminster, S.W.); Wyard 15722 1st Class Air Mech. L. (Parkeston).

MISSING.

DEC. 13th.—R.F.C.—Conlin P7281 2nd Class Air Mech P. (Barrow-in-Furness).

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONERS OF WAR IN GERMAN HANDS.

DEC. 13th.—R.F.C.—Hewitt 94294 2nd Class Air Mech. W. (Portadown); Hughes 6211 2nd Class Air Mech. T. W. (Llanidloes).

AUSTRALIAN IMPERIAL FORCE.

KILLED.

DEC. 10th.—A.F.C.—Gamble 906 H.E.

PERSONAL NOTICES.

DEATHS.

ANDREW.—Sec. Lt. James Lionel Andrew, R.F.C., who was killed on Dec. 13th, as the result of an accident whilst flying, was the only son of Mrs. Andrew, of Putney, and son-in-law of Chas. W. Heap, 879, Fulham Road, S.W. He was 30 years of age.

WINNICOTT.—Lt. Russell Winnicott, M.C., R.F.C., who was killed in action on Dec. 6th, was the youngest son of Richard W. and Annie Winnicott, Hyperion, Mannamead, Plymouth. He was 19 years of age.

ENGAGEMENTS.

CLARKE—JENKINS.—The engagement is announced of Lt. P. H. Clarke, R.H.A., attd. R.F.C., and Beatrice, only daughter of Mr. J. Jenkins and Mrs. Jenkins, of Southampton.

GETHIN—STAPLEDON.—The marriage arranged between Capt. P. E. L. Gethin, R.F.C., and Miss Norah Stapledon will take place very quietly on Jan. 17th, in Exeter, leave permitting.

GREY—DOWNES.—The marriage between Sec. Lt. Trevlyn Grey, A.F.C., only son of Mrs. Grey, of Sydney, N.S.W., and Katharine, younger daughter of the vicar of Batheaston, Bath, and Mrs. Downes, will take place on Jan. 2nd at Batheaston.

HIGGIN—EARLE.—The engagement is announced of Capt. W. W. Higgin, King's (Liverpool) Regt. and R.F.C., only son of Mr. and Mrs. W. S. Higgin, Freshfield, Lancs., to Olive, only daughter of Mr. and Mrs. A. B. Earle, The Old Hall, Puddington, Neston, Cheshire.

KYFFIN—WILLS.—An engagement is announced between John Trevor Kyffin, R.F.C., only son of Lt.-Col. John Kyffin, R.A.M.C., of Penrhyn, Alverstoke, Hants, to Margaret Joyce de Winton Wills, second daughter of Mr. and Mrs. Wills, Ramsbury Manor, Wiltshire.

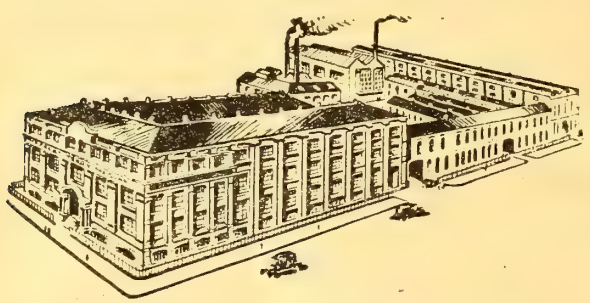
MARRIAGES.

FRENCH—MARSON.—On Dec. 18th, at the Parish Church of S. Paul, Cullercoats, Capt. Hartley French, W. York. R. and R.F.C. (Staff), only son of Mr. and Mrs. Hartley French, Jun., of Sunderland, was married to Ruby, youngest daughter of Mrs. and the late Mr. Robert Marson, of Whitley Bay, by the Rev. F. L. Cattell, vicar.

DUGGAN.—SHEPPARD.—On the 19th inst., at St. Mary's Parish Church, Wimbledon, Lt. E. S. Duggan, R.F.C., youngest son of Mr. and Mrs. E. H. Duggan, of Toronto, was married to Gladys Edith, daughter of Mr. and Mrs. S. C. Sheppard, Atherton Grange, Wimbledon, late of Rio de Janeiro, by the Rev. Canon J. Allen Bell.

BIRTHS.

LAMBERT.—On Dec. 19th, at 109, St. Mark's Road, Kensington, W.10, to Phyllis, wife of Capt. W. Lambert, R.F.C.—a son.



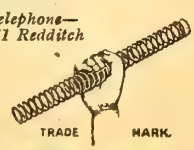
TERRY'S

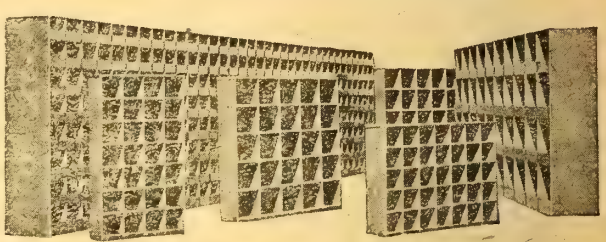
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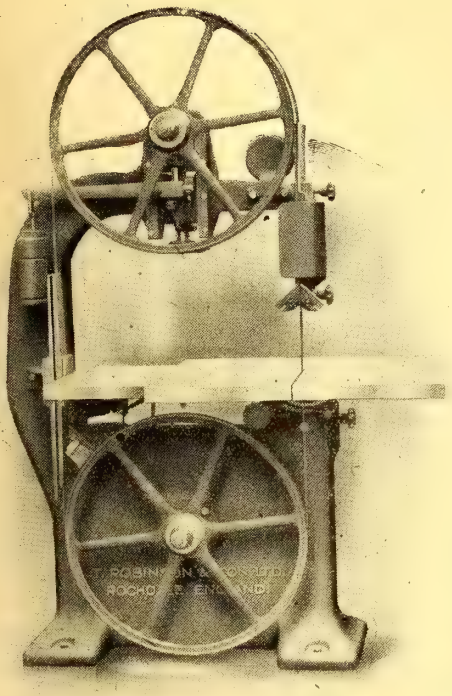
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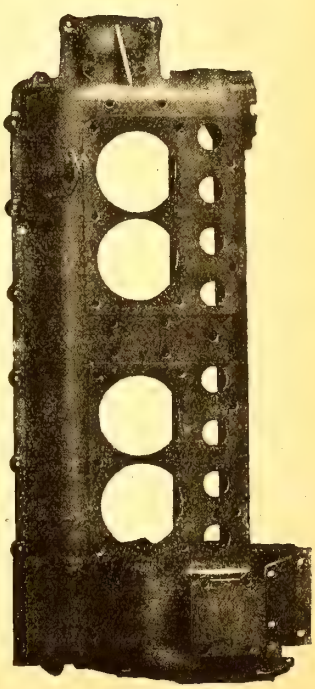
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LIDDERDALE.—On Dec. 16th, at Red House, Lincoln, Maud (née Hanson Walker), wife of Sqdn. Comdr. J. H. Lidderdale, R.N., of a daughter.

PURKISS-GINN.—On Dec. 9th, at a private nursing home, Belfast, to Stuart Purkiss-Ginn (Essex R., attd. R.F.C.) and Etta Purkiss-Ginn—a son.

* * *

Mr. T. B. Middleton of Shankill, Co. Dublin, has received news that the following aviators, including his son, reported missing, are prisoners in Germany, and are not wounded:—Lt. A. F. Goodchap, Lt. A. H. Middleton, Lt. Wingard, George G. Peterson, and Lt. Stanley Grove Spiro, all of the R.F.C.

FRANCE.

Official Communiqués.

Dec. 19th.—On the night of Dec. 18th German aeroplanes dropped about 50 bombs in the region of Dunkirk. No casualties have been reported up to the present.

Dec. 20th.—During the day of the 19th some German aeroplanes dropped bombs in the region of Dunkirk and Calais. Four persons were killed and 10 wounded.

GERMANY.

Official Communiqués.

Dec. 19th.—Lt. Bongartz obtained his 27th victory in the air. Our aviators effectively attacked with bombs London, Ramsgate, and Margate.

ITALY.

Official Communiqué.

Dec. 20th.—A hostile aeroplane was brought down by one of our aviators to the north of Mt. Grappa; another machine, driven down by anti-aircraft fire, fell in the neighbourhood of Lovadina.

* * *

It was reported on Dec. 17th by the "Times" correspondent at Milan that Lt. Papa has beaten his own world's "record" for high flying with a passenger. On an Italian machine he rose 7,075 metres (23,220 ft.), returning to camp after an hour and five minutes' absence. He broke the "record" last May, rising to 6,435 metres (21,000 ft.). Lack of oxygen prevented an even higher flight this time.

[It should be pointed out that Herr Oelerich on a D.F.W. biplane reached an altitude of 25,750 ft. in June, 1914.—Ed.]

* * *

The special correspondent of the "Morning Post," writing from the Italian Front on Dec. 14th, says:—

For the first time in this mountain fighting the Austrians sent their aviators out to-day to fire with machine-guns on the Italian reserves behind the line. It is a curious coincidence that quite independently the Italians had organised the same thing, and the two flocks of aeroplanes started on their parallel errands and returned without either party noticing the other, though the spheres of action they were making for were only a few miles apart.

TURKEY.

Official Communiqué.

Dec. 19th.—Aeroplane activity is increasing on the whole front.

HOLLAND.

It is reported from Roermond on Dec. 19th that a German aeroplane came down last night near Heithuysen. The two occupants were interned. The machine was possibly one of those which raided England on Dec. 18th.

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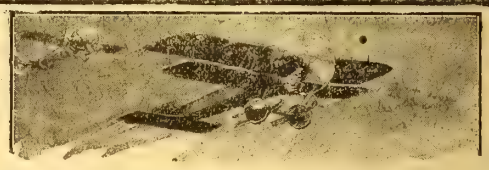
By the generosity of members of the Over-Seas Club a convalescent home for flying officers in the R.F.C., entitled the R.F.C., Auxiliary Hospital, Over-Seas Club branch, has been opened near Croydon, at Shirley Park, which affords many facilities for out-door recreation.

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Two victims of a recent air attack on London, Mrs. Edith Howie and her niece, Edith Calloway, were buried on Dec. 13th in the presence of a large gathering of people. Each coffin was covered with the Union Jack, and they were conveyed to the cemetery in motor ambulances of the British Red Cross. Volunteer first-aid men who helped at the time of the raid acted as bearers.

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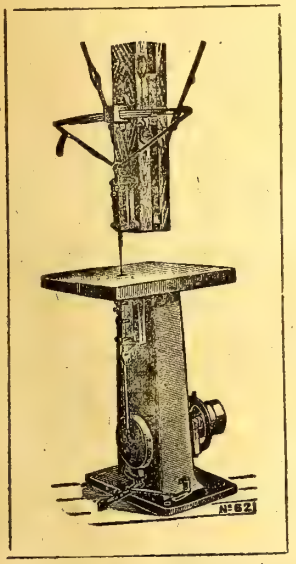
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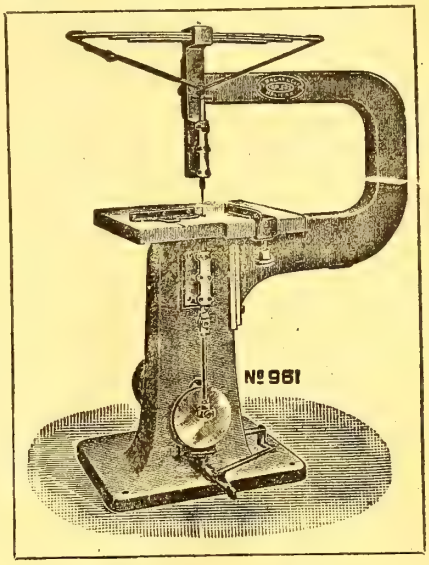
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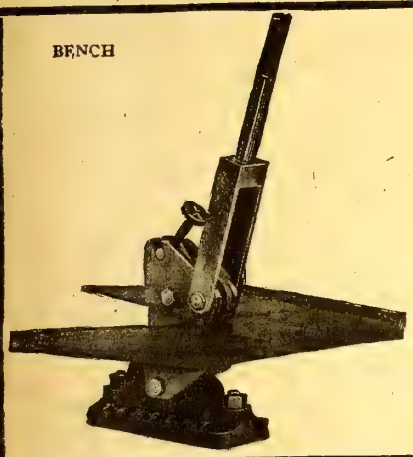
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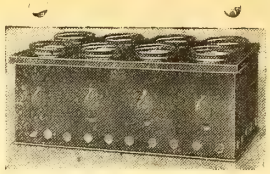
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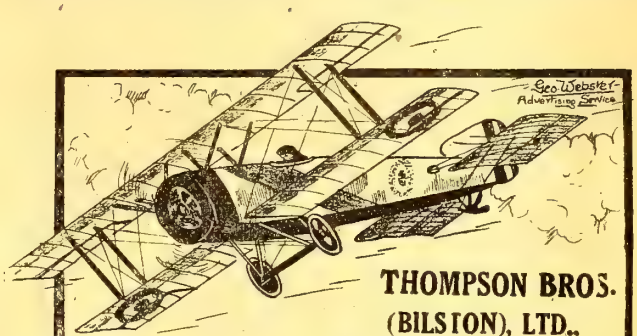
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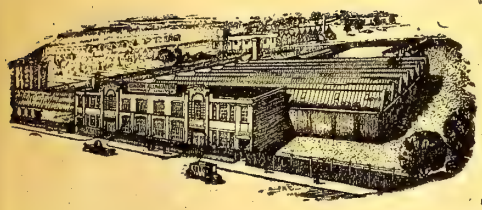
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